REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8106180413 DOC.DATE: 81/06/16 NOTARIZED: NO DOCKET #
FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
AUTH.NAME AUTHOR AFFILIATION
CURTIS,N.W. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards info which completes SER Outstanding Issue 32 w/ exception that microstructure of SA 216 WCB main steam isolation valve body be confirmed by metallography as normalized & tempered.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 44
TITLE: FSAR/FSAR AMDTS and Related Correspondence

NOTES:Send I&E 3 copies FSAR & all amends.1 cy:BWR-LRG PM(L.RIB) 05000387
Send I&E 3 copies FSAR & all amends.1 cy:BWR-LRG PM(L.RIB) 05000388

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ACTION:	A/D LICENSNG	1	0	LIC BR #2 BC	1	0
	LIC BR #2 LA	1	0	STARK,R. 04	1	1
INTERNAL:	ACCID EVAL BR26	1	1	AUX SYS BR 27	1	1
	CHEM ENG BR 11	1	1	CONT SYS BR 09	1	1
	CORE PERF BR 10	1	1	EFF TR SYS BR12	1	1
	EMERG PREP 22	1	0	EMRG PRP DEV 35	1	1
	EMRG PRP LIC 36	3	3	EQUIP QUAL BR13	3	3
	FEMA-REP DIV 39	1	1	GEOSCIENCES 28	2	2
	HUM FACT ENG 40	1	1	HYD/GEO BR 30	2	2
	I&C SYS BR 16	1	1	I&E 06	3	3
	LIC GUID BR 33	1	1	LIC QUAL BR 32	1	1
	MATL ENG BR 17	1	1	MECH ENG BR 18	1	1
	MPA	1	0	NRC PDR 02	1	1
	OELD	1	0	OP LIC BR 34	1	1
	POWER SYS BR 19	1	1	PROC/TST REV 20	1	1
	QA BR 21	1	1	RAD ASSESS BR22	1	1
	REAC SYS BR 23	1	1	REG FILE 01	1	1
	SIT ANAL BR 24	1	1	STRUCT ENG BR25	1	1
EXTERNAL:	ACRS 41	16	16	LPDR 03	1	1
	NSIC 05	1	1			

MDY

JUN 19 1981

TOTAL NUMBER OF COPIES REQUIRED: LTTR ~~62~~ 63 ENCL ~~56~~ 57

TWO NORTH NINTH STREET, ALLENTOWN, PA. 18101 PHONE: (215) 770-5151

NORMAN W. CURTIS
Vice President-Engineering & Construction-Nuclear
770-5381

RECEIVED
JUN 17 1981
U.S. NUCLEAR REGULATORY COMMISSION

June 16, 1981

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket Nos. 50-387
388

SUSQUEHANNA STEAM ELECTRIC STATION
SER OUTSTANDING ISSUE #32
ER100450 FILE 841-2
PLA-811

Dear Mr. Schwencer:

Attached is the requested information which completes SER Outstanding Issue #32 with exception that the microstructure of SA 216 WCB main steam isolation valve body be confirmed by metallography as normalized and tempered.

Very truly yours,

N.W. Curtis
Vice President-Engineering and Construction-Nuclear

cc: R.M. Stark

8106180413

E

B001
S 1/1

TECHNICAL BASIS FOR SUSQUEHANNA 1

SAFETY EVALUATION REPORT

GDC 51 COMPLIANCE

1. Lowest Service Metal Temperature

The lowest service metal temperature (LSMT) which will be experienced by the materials of the Susquehanna Unit 1 Reactor Containment Pressure Boundary is identified as 60°F (Kretzschmar-Bechtel note dated March 11, 1981) for the material comprising the containment pressure boundary.

2. Containment Pressure Boundary Materials - Ferritic

The materials assessed with respect to fracture toughness were those of the following components:

a. Suppression Chamber Access Hatch Flanges

The plate material is SA 516 Grade 60, and was normalized. At the maximum thickness of 4¼", ASME Section III, Summer 1977 Addenda, Class 2 rules require that 50°F be added to the material's NDT. Using the 0°F temperature assigned by the Summer 1977 Addenda, Class 2 rules results in an LSMT of 50°F for the suppression chamber access hatch flange, which is below the postulated design LSMT of 60°F.

b. Dry Well Head Flange

The dry well head flange is SA 516, Grade 70 material, quenched and tempered. The maximum thickness is 4". Summer 1977 Addenda, Class 2 rules assign a T_{NDT} of -10°F and an LSMT of +40°F.

c. Penetrations

1. Penetration Sleeves

The limiting SA 516, Grade 60 normalized material is a maximum thickness of 2¼", applied in penetration X9A. Summer 1977 Addenda Class 2 rules assign a T_{NDT} of 0°F, and an LSMT of +30°F. The limiting SA 333, Grade 1 normalized material is a maximum thickness of 1.16". It was Charpy "V" tested at -50°F to mils lateral expansion (MLE) criteria consistant with Summer 1977 Class 2 rules, and was applied in penetration X-15.

2. End Caps

The end cap for X-15 penetration was made from SA 234 Grade WPB that originated as SA 516 Grade 70 plate, and was normalized. The cap is 1.16" thick and was Charpy "V" tested at 0°F to MLE criteria consistant with Summer 1977 Addenda, Class 2 rules.

3. Flued Heads

Limiting flued head material is used in the main steam system penetration at an axial thickness of 8". The material is SA 350, Gr. LF-2, quenched and tempered. Nureg 0577, table 4.4 assigns an ($\overline{NDT}$ +1.3σ) NDT of -5°F and an $\overline{NDT}$ of -28°F to normalized C-Mn materials. The SA 350 LF2 material, however, is quenched and tempered and could reasonably assumed to have a T_{NDT} in that population below -28°F. On this basis, assuming a T_{NDT} of -28°F, Summer 1977 Addenda, Class 2 rules would assign an LSMT of approximately 45°F to the material. Limiting flued head material is used in the feedwater system at an axial thickness of 8". This material is SA 541 Class 1, which would be categorized by Nureg 0577, Table 4.4 as C-Mn with an ($\overline{NDT}$ +1.3σ) NDT of -5°F and an NDT of -28°F. The analysis applied for the main steam flued head material, SA 350 LF2, is applicable for this material for an LSMT of 45°F.

4. Process Pipe

The process pipes of the limiting penetrations are integral with the flued heads.

d. Isolation Valves (Both main steam and feedwater isolation valves are connected directly to penetration flued heads).

1. Main Steam

The main steam isolation valve bodies were manufactured as SA 216 Gr. WCB, less than 2.5" thick, normalized and tempered. The related CMTRs do not indicate that the material was tested for fracture toughness. However, it may be estimated from NUREG 0577 (Figure B.2) that a non-specific NDT of 10°F or lower would apply to normalized and tempered SA 216 Gr. WCB in this thickness. The Summer 1977 Addenda Class 2, rules assign an LSMT of 40°F.

The covers (bonnets) and discs (poppets) were made from SA 105, and were normalized. The limiting thickness is 5.88" in the poppet. Nureg 0577, Table 4.4 assigns an ($\overline{NDT}$ +1.3σ) NDT of -5 to the material. Summer 1977 Addenda, Class 2 rules assign an LSMT of +55°F to the material.

The bolting of interest is SA 193 Gr. B7 studs with SA 194 Gr. 2H nuts, which were not impact tested. Based on the generally accepted metallurgical characterization of the microstructure of these materials in the quenched and tempered condition (tempered martensite), their fracture toughness can be reasonably estimated to be comparable to that of the body, cover and disc materials.

2. Feedwater System

The feedwater isolation valve bodies are 2.33" thick and were manufactured as SA 352, Grade LCB which were normalized, quenched, and tempered. The material was C_v tested at 35°F to MLE criteria consistant with Summer 1977 Addenda, Class 2 Criteria.

The valve bonnet is 4.995" thick and was manufactured from quenched and tempered SA 105. The limiting thickness is 5". The Summer 1977 Addenda requires that 55°F be added to the material's NDT. Using the −5°F temperature assigned by Table 4.4 of NUREG 0577 results in an LSMT of 50°F for the bonnet, which is below the design LSMT of 60°F.

The valve disc was manufactured from SA 352 Grade LCB, and was normalized and tempered. The thickness of interest is 3". The material was C_v tested at +35°F to 60-68 MLE. Summer 1977 Addenda Class 2 rules assign 2½" material 40 MLE criteria. On the basis of the C_v test data, it is reasonable to assume that the T_{NDT} of the material will lie in that NDT data population below 35°F as given in Table 4.4 of NUREG 0577. Given such T_{NDT}, it is reasonably assumed that the postulated +60°F LSMT will be in compliance with the Summer 1977 Addenda Class 2 rules.

The bolting of interest is SA 193 Gr. B7 studs with SA 194 Gr. 2H nuts. Based on the generally accepted metallurgical characterization of the microstructure of these materials in the quenched and tempered condition (tempered martensite), their fracture toughness can be reasonably estimated to be comparible to that of the body, cover and disc materials.

United States Steel Corporation

SUPPRESSION CHAMBER ACCESS HATCH FLANGE

J. JAMES HERTY, NOTARY PUBLIC
PITTSBURGH, ALLEGHENY COUNTY
MY COMMISSION EXPIRES APRIL 30, 1977

TEST REPORT OF: PLATES

WORKS: HOMESTEAD DISTRICT U.S.S. ORDER NO. LC55491 LOAD TAILY OR INVOICE NO. 163-46067

CUSTOMER ORDER NO. 73-55180-18 9/25/73

CAR OR TRUCK NO. PLE 046107 SHIPPER NO & DATE 58245 12/28/73 160

STATE OF PENNSYLVANIA
COUNTY OF ALLEGHENY

SUBSCRIBED AND SWORN TO BEFORE M
THIS 21st DAY OF Dec 1973

CHICAGO BRIDGE AND IRON CO
P O BOX 610
GREENVILLE PA 16125

SHIP TO: CHICAGO BRIDGE & IRON CO
GREENVILLE PA

BEING DULY SWORN ACC
TO LAW, DEPOSES AND
THAT THE CHEMICAL AN
AND/OR TESTS SHOWN I
REPORT ARE CORRECT. A
TAINED IN THE RECORD
THE COMPANY.

ASME-SA516-72-PRESSURE-VESSEL-QUAL-WNT-1972-ADDEN-GRADE-60-MOD-CB&
I-SPEC-HS691-REV-0-6/15/73-QAS-SPEC-333-REV-0-6/15/73-NORMALIZE-TE
ST-SPEC-S/R-FOR-15HRS-WTH-OPT-CHRPY-V-NTCH-IMP-LONG-PR-MINUS-30D-F

011544

M SWORN T/R ANALYSIS FULL ANAL ALSO ASME SA-516 GRADE 60 & Q
AS PEC 333 REV. 0 & HS 691.

SIGNATURE H. H. MAXSON, CH

DATE 12/28/73

0703

ITEM NO.	HEAT NO.	TEST OR PIECE IDENTITY NO.	NO. PCS.	THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	WEIGHT	YIELD PT. PSI	TENSILE STR. PSI	ELONGATION % IN 8"	IN 2"
43	AH6273	279058 BC	3	4 1/4	81	81	23700	* 40.9	67.1		30

FULL SIZE LONG. V NOTCH CHARPY IMPACT TEST 10X10MM MADE AT -30 DEG. F. 032.0-034.0-059.0 FT
% SHEAR DATE 041.0-041.0-038.0 AND LATERAL EXPANSION 27-30-50 MILS.
AVERAGE IMPACT STRENGTH = 42

ABOVE TEST SPECIMENS STRESS RELIEVED AT 1175 DEG. F. HTD. 15.00 HRS., FRN. COOLED TO 600 DEG. F.
TEST SPECIMENS CHARGED COLD. HEATING RATE 100 DEG. F. PER HOUR. COOLING RATE 125 DEG. F. PER
ABOVE VALUES EXPRESSED IN K.S.I.
LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.

PLATE NORMALIZED @ 1652 DEG. F. PLUS OR MINUS 25 DEG. F. HTD. 120.0 MINUTES. AIR COOLED.

CBI CONTRACT NOS. 73-55180-00
BECHTEL SUBCONTRACT NO. 8856-C-50
SUSQUEHANNA STATION
BERWICK PENNSYLVANIA

JAN 3 1974

*YIELD POINT @ .0050 EXT.

CHECK SIZE TESTED ACCORDING TO COMPANY RECORDS, CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

* & H INDICATE COMPLIANCE OF YIELD OR HOMO. TEST.

HEAT NO.	TYPE	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	Cb	V	B	Ti	Cb	Ce	
AH6273	LADL	16	112	011	011	24													AVG GR SIZE 08 FIN

FORM 0-30831 REV 671 02,000 0245

PURCHASER: 962
Chicago Bridge & Iron Co.
Greenville, Pa. 16125

LUKENS STEEL COMPANY
COATESVILLE, PA. 19320
TEST CERTIFICATE

MILL ORDER NO.	CUSTOMER P.O.	
77318-1	73-55180-57	DP 51074 JW

Dry Weld Head Plate 704-1
APPL: 6-6-74 FILE NO. 1540-03-06
CONSIGNEE:
C-50 936
C-50
3-17-75 B.J.

RECEIVED JUN 10 1974 ENGINEERING

MATERIAL HAS BEEN MANUFACTURED AND TESTED IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS AND SPECIFICATION(S)

CB&I MS-6017 Rev. 1 1973 QAB-333 SA-516 Gr. 70 ASME Code Section 2 & 3 Ed. Wo 1971 Edition Thru Summer 1972 Addenda

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B	Grain Size
C4029	25	1.08	016	025		24								7-8

RECORD COPY

CBI CONTRACT NOS. 73-5510/DV
BECHTEL SUBCONTRACT NO. 8050-C-50
SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

PHYSICAL PROPERTIES

MELT NO.	SLAB NO.	YIELD PSI X100	TENSILE PSI X100	% ELONG. IN 2"	% R.A.	BHN	IMPACT Long. V-Notch -30°F.			Fracture Appearance % Shear	DESCRIPTION
C4029	2	554 500	767 752	29 31			23	34	37	30-30-30	1-4" x 107 x 360
							Lateral Expansion in Inches .030	.028	.017		

L.G. McAnallen
Bechtel
1-14-75

Affirmed and subscribed before me this day of JUN 6 1974

Phillip A. Commodore Jr.
Notary Public
My Commission Expires April 1, 1978

ate and tests heated to 1625°F./1675°F., held 1/2 hr. per inch min., and ter quenched, then tempered 1220°F., held 1/2 hr. per inch min., and water enched.

sts stress relieved by heating within a rate of 100°F. per hr. to 1150°F., held hrs. and furnace cooled within a rate of 125°F. per hr. to 600°F.

295

I hereby certify the above information is correct

IN REPLY PLEASE REF.:

BLP 14636

Mr. E. M. Mead
Pennsylvania Power & Light Co
P. O. Box 1870
Allentown, Pennsylvania 18105

RECEIVED
APR 20 1981
NUCLEAR REC. SYS.

Bechtel Power Corporation
Engineers—Constructors
Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

PENETRATION SLEEVE
X-9A

APR 15 '81 137765

Subject: Susquehanna Steam Electric Station
Units 1 and 2 Job 8856
GDC-51 Compliance Report

RECEIVED
APR 21 1981
NUC PLT ENGRG

SUSQUEHANNA SES
ER 100450
FILE No. 840-4

Dear Earle:

In the SER support meetings with the NRC on March 26, 1981 and March 27, 1981, SFHO took an action to determine the materials used in Penetrations and End Caps. The following are the materials and maximum thicknesses of each item.

Item	Material	Maximum Thickness	Penetration No.
Pipe (Seamless)	SA-333, Gr. 1	1.156"	X-15 & X-44
Pipe Caps	SA-234, Gr. WPB	1.156"	X-15 & X-44
Pipe (Seamwelded)	SA-516, Gr. 60	2.25"	X-9A & B

SA-516, grade 60 was not presented previously since it is not the thickest component for that material. Penetrations X-200 A & B have flanges made of SA-516, grade 60 material which are 3-11/16" thick. This component is listed under "Suppression Chamber Access Hatch Flanges" in the GDC-51 report. Materials SA-333, grade 6 and SA-516, grade 70 could also have been used for penetration material, but have not been used.

If you have any additional questions, please contact us.

Very truly yours,

E. B. Poser
Project Engineer

Written Response Req'd: No
Design Document Changes: No
GDP/BGK/cgs

WP24/3-1

Proj. Director
Asst. Proj. Director
Mgr. Proj. Services
Cost & Schedule
Contracts
Licensing
Nuc. Plt. Eng. Mgr.
Asst. Nuc. Plt. Eng. Mgr.
Supv. Eng.
Mechanical
Electrical
Inst. & Control
Civil
Fire Prot.
Spare Parts
Containment
Services
Plant Supt.
S & T Supv.
Field Eng.
Proj. Const. Mgr.
E. Bunge
F. L. [illegible]
[illegible]

5026

PRODUCTION DEPARTMENT - METALLURGICAL

United States Steel Corporation

CORRECTED TEST REPORT 4/15/74

HOMESTEAD DUBO, ALLEGHENY COUNTY
MY COMMISSION EXPIRES APRIL 30, 1977
Member, Pennsylvania Association of Notaries

TEST REPORT OF PLATES PENETRATION SLEEVE X-9A

WORKS HOMESTEAD DISTRICT USS ORDER NO. LC68630 LOAD TALLY OR INVOICE NO 163-22907

CUSTOMER ORDER NO 73-5510U-23 11/27/73

CAR OR TRUCK NO. BO 364061 SHIPPER NO. & DATE 41605 2/01/74 160

STATE OF PENNSYLVANIA
COUNTY OF ALLEGHENY

SUBSCRIBED AND SWORN TO BEFORE ME THIS 6TH DAY OF FEB 1974.

CHICAGO BRIDGE AND IRON CO
P O BOX 610
GREENVILLE PA 16125

SHIP TO: CHICAGO BRIDGE & IRON CO
GREENVILLE PA

BEING DULY SWORN ACCORDING TO LAW, DEPOSES AND SAYS, THAT THE CHEMICAL ANALYSIS AND/OR TESTS SHOWN IN THIS REPORT ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

ASME-SA516-72-PRESSURE-VESSEL-QUAL-WNT-1972-ADDLN-GRADE-60-MOD-GRA
I-SPEC-U5691-REV-0-6/15/73-UAS-SPEC-333-REV-0-6/15/73-NORMALIZE-TE
ST-SPEC-S/R-FOR-15HRS-HTH-OPT-CHRPY-V-NTCH-THP-LONG-PR-MINUS-30D-F

011544

NI SHOWN T/R ANALYSIS FULL ANAL ALSO ASME SA-516 GR 60 MS-691 REV Q UAS 333 REV 0

SIGNATURE H. H. HAXSON, CH. MET.
DATE 02/07/74

07-03

ITEM NO.	HEAT NO.	TEST OR PIECE IDENTITY NO.	NO. PCS.	THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	WEIGHT	YIELD PT. PSI.	TENSILE STR. PSI.	ELONGATION % IN 8"	ELONGATION % IN 2"	% RED OF AREA
62	1H6564	14544 UC	2	2 1/4	66 1/2	126	10602	* 39.6	64.4		32.0	

ABOVE TEST SPECIMENS STRESS RELIEVED AT 1150 DEG. F. HTD. 15.00 HRS. FCE. COOLED TO BELOW 600 DEG. F. TEST SPECIMENS CHARGED COLD, HEATING RATE 180 DEG. F. PER HOUR, COOLING RATE 230 DEG. F. PER HOUR.

FULL SIZE LONG V NOTCH CHARPY IMPACT TEST 10x10 MM MADE AT - 30 DEG. F. 48-28-90 FT. LBS.
% SHEARRATE 38-37-49 ADN LATERAL EXPANSION 40-22-74 MILS. AVERAGE IMPACT STRENGTH - 55

ABOVE VALUES EXPRESSED IN K.S.I.
LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.

PLATE NORMALIZED @ 1652 DEG. F. PLUS OR MINUS 25 DEG. F. HTD. 225.0 MINUTES. AIR COOLED.

CLASS 5.2 FOLDER 5 NO. 1

2-7-75

WHEN SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

* YIELD POINT @ .0050 EXT.

* B OR H INDICATE COMPLIANCE OF BEND OR HOMO TESTS, RESPECTIVELY

HEAT NO	TYPE	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	N	V	B	Ti	Cb	Co
1H6564	LADL	14	110	009	010	26												

CBI CONTRACT NOS. 73-5510/[illegible]U
BECHTEL SUBCONTRACT NO. 8856-C-50
SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

AVG GR SIZE 08

218

FORM G-70831 REV. 671 02.000 0441

PENETRATION SLEEVE - X-15 W.G. Rhoades

Bechtel Power Corporation
Engineers—Constructors
Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94139

IN REPLY PLEASE REF.:

BLP 14636

RECEIVED APR 20 1981 NUCLEAR REC. SYS.

Mr. E. M. Mead
Pennsylvania Power & Light Co.
P. O. Box 1870
Allentown, Pennsylvania 18105

Subject: Susquehanna Steam Electric Station
Units 1 and 2 Job 8856
GDC-51 Compliance Report

APR 15 '81 137765

RECEIVED APR 21 1981 NUC PLT ENGRG

SUSQUEHANNA SES
ER 100450
FILE No. 840-4

Dear Earle:

In the SER support meetings with the NRC on March 26, 1981 and March 27, 1981, SFHO took an action to determine the materials used in Penetrations and End Caps. The following are the materials and maximum thicknesses of each item.

Item	Material	Maximum Thickness	Penetration No.
Pipe (Seamless)	SA-333, Gr. 1	1.156"	X-15 & X-44
Pipe Caps	SA-234, Gr. WPB	1.156"	X-15 & X-44
Pipe (Seamwelded)	SA-516, Gr. 60	2.25"	X-9A & B

SA-516, grade 60 was not presented previously since it is not the thickest component for that material. Penetrations X-200 A & B have flanges made of SA-516, grade 60 material which are 3-11/16" thick. This component is listed under "Suppression Chamber Access Hatch Flanges" in the GDC-51 report. Materials SA-333, grade 6 and SA-516, grade 70 could also have been used for penetration material, but have not been used.

If you have any additional questions, please contact us.

Very truly yours,

E. B. Poser
Project Engineer

Proj. Director
Asst. Proj. Director
Mgr. Proj. Services
Cost & Schedule
Contracts
Licensing
Nuc. Plt. Eng. Mgr.
Asst. Nuc. Plt. Eng. Mgr.
Supv. Eng.
Mechanical
Electrical
Inst. & Control
Civil
Fire Prot.
Spare Parts
Containment
Services
Plant Supt.
S & T Supv.
Field Eng'g
E Cruger
Fl
Little

Written Response Req'd: No
Design Document Changes: No
GDP/BGK/cgs

WP24/3-1

5026

CAPITOL PIPE WORLD-WIDE

NUCLEAR PRODUCTS DIVISION OF capitol PIPE & STEEL PRODUCTS, INC.

PENETRATION SLEEVE, NO. X-15

June 17

CBI CONTRACT NOS. 73-5518/19
BECHTEL SUBCONTRACT NO. 8856-C-59
SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

MATERIAL CERTIFICATION

Item: 18" S/100 SMLS ASME SA-333 GR 1

Heat Number: K 4082 CAMERON IRON WORKS, INC.

Other Identification: CBI P.O.# G-81581-5518/19
Contract# 735518/19

Specification: ASME SA-333 GR 1

Material Identification: Paint Stencil

Mfgr Name
Specification
Size, Sch Heat LT-50
Seamless
PO G-81581-5518/19
Contract 735518/19
Hydro Press 2697

We Certify that the above listed material conforms to the requirements of ASME SA-333 GR 1 and CBI Specifications MS-736 REV-0 to QAS-333 REV-0.

Sworn to and subscribed before me this [illegible]

MURRAY HERBERT FELDMAN NOTARY PUBLIC COMMONWEALTH OF PENNSYLVANIA

Notary Public, Allegheny Co.
My Commission Expires Mar 19, 1977

E. C. HINKLE
NUCLEAR DIVISION

273

CERTIFICATE OF TEST ON PIPE MATERIAL

1.1563

Cameron IRON WORKS, INC.

P. O. BOX 1212
HOUSTON, TEXAS 77001

SOLD TO

CAPITOL PIPE & STEEL PRODUCTS, INC.
301 City Line Avenue
Bala-Cynwyd, Pa. 19004

CBI CONTRACT NOS. 73-5518/[illegible]U
BECHTEL SUBCONTRACT NO. 8856-C-50
SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

PENETRATION SLEEVE
No. X-15

Date 9 April 1974

Customer Order No.	C.I.W. Sales Order No.	Specification
64531-00N	F-14529	ASTM/ASME-A333/SA333 Gr. 6 W/Ck. Anal. per Para. 8

Description of Material O.D. 18" x I.D. x WALL Sch. 100

C.I.W. Part No. 86-4529-180-157

Chicago Bridge & Iron
P.O.# G-81581-5518/19
H-61782 Ch#
Item# [illegible]

Heat No.	Location or Serial No.	CHEMICAL ANALYSIS C	MN	P	S	SI	CR	Ni	MO
J 4286		.18	1.21	.013	.011	.34			
	Check Anal.	.18	1.19	.015	.012	.36			
K 4082		.16	1.28	.010	.012	.35			
	Check Anal.	.18	1.28	.011	.014	.36			
L 1442		.18	1.15	.011	.014	.26			
	Check Anal.	.19	1.15	.008	.013	.26			

10 X 10 MM Size

Quantity or Serial No.	Heat No.	Test Loc.	Tensile PSI	Yield Point % Offset Yield PSI	% Elong. In. 2"	% Red. Area	Test Lot#	Flat Tening Test	Impact Results at -5 V-Notch (Axial) Ft. Lbs.	Lat. Exp.	D/F
1	J 4286	Trans.	72,400	52,600	32.2	63.5	#750—	OK	135.0	.092	60%
									110.0	.048	50
									87.0	.071	35
1	K 4082	Trans.	74,900	54,900	32.5	64.7	#750	OK	68.0	.055	30%
									83.0	.068	35
									59.0	.048	30
1	L 1442	Trans.	69,600	48,400	33.7	67.0	#750	OK	13.0	.013	10%
									18.0	.015	10
									61.0	.053	30

GRADE 6 ACCEPTABLE

SEE RAD # 1.

Forg/Ser.#	Heat#	Test Lot#
#17565	J 4286	#750
17566	K 4082	750
17567	L-1442	750

WE HEREBY CERTIFY THAT THIS IS A TRUE [illegible] CHEMICAL MILL TEST [illegible] FILE WITH CAPITAL PIPE AND STEEL PRODUCTS, INC.

SIGNED [illegible] DATE 4-17-74

Hydrostatic Test: Each length of pipe hydrostatically tested at 2697 psi for 5 sec. and found acceptable

Heat Treatment: Normalized.

1700°F., hold 2 hrs. at temp. Air Cooled.

CLASS 5.2
FOLDER 6a NO. 5

Subscribed and Sworn to before me this 9th Day of April 1974

Notary Public TOUCHTON
Notary Public in and for Harris County, Texas
My Commission Expires June 1, 1975

I certify these tests to be correct as contained in the records of the company.

Metallurgical Representative [illegible]

CAMERON 1049 4/70

IN REPLY PLEASE REF.:

BLP 14636

Mr. E. M. Mead
Pennsylvania Power & Light Co
P. O. Box 1870
Allentown, Pennsylvania 18105

RECEIVED
APR 20 1981
NUCLEAR REC. SYS.

Bechtel Power Corporation
Engineers—Constructors
Fifty Beale Street
San Francisco, California
Mail Address: P O Box 3965, San Francisco, CA 94119

PENETRATION SLEEVE
END CAP - No. X-15
APR 15 '81 137765

Subject: Susquehanna Steam Electric Station
Units 1 and 2 Job 8856
GDC-51 Compliance Report

RECEIVED
APR 21 1981
NUC PLT ENGRG

SUSQUEHANNA SES
ER 100450
FILE No. 840-4

Dear Earle:

In the SER support meetings with the NRC on March 26, 1981 and March 27, 1981, SFHO took an action to determine the materials used in Penetrations and End Caps. The following are the materials and maximum thicknesses of each item.

Item	Material	Maximum Thickness	Penetration No.
Pipe (Seamless)	SA-333, Gr. 1	1.156"	X-15 & X-44
Pipe Caps	SA-234, Gr. WPB	1.156"	X-15 & X-44
Pipe (Seamwelded)	SA-516, Gr. 60	2.25"	X-9A & B

SA-516, grade 60 was not presented previously since it is not the thickest component for that material. Penetrations X-200 A & B have flanges made of SA-516, grade 60 material which are 3-11/16" thick. This component is listed under "Suppression Chamber Access Hatch Flanges" in the GDC-51 report. Materials SA-333, grade 6 and SA-516, grade 70 could also have been used for penetration material, but have not been used.

If you have any additional questions, please contact us.

Very truly yours,

E. B. Poser
Project Engineer

Written Response Req'd: No
Design Document Changes: No
GDP/BGK/cgs

WP24/3-1

Proj. Director
Asst. Proj. Director
Mgr. Proj. Services
Cost & Schedule
Contracts
Licensing
Nuc. Plt. Eng. Mgr.
Asst. Nuc. Plt. Eng. Mgr.
Supv. Eng.
Mechanical
Electrical
Inst. & Control
Civil
Fire Prot.
Spare Parts
Containment
Services
Plant Supt.
S.S.I. Supv.
Field Eng'g
Proj. Const. Mgr.

541-2/V

CUDAHY • WISCONSIN • 10

METALLURGICAL MATERIAL ANALYSIS REPORT

Chicago Bridge & Iron Co.
Mercer County
Greenville, Pa. 16125

CUSTOMER ORDER NO.	LADISH ORDER NO.	LADISH INVOICE NO.
1112368-5516/1	672726A	F 95668

SHIP TO: CUSTOMER'S NAME AND ORDER REFERENCE, MARK, ETC.
REPORT REQUESTED (Rec'd: 380)

SHIPPED FROM	DATE SHIPPED	DATE OF REPORT
REVISED 7-24-75	9-23-74	11-20-74

ITEM	PCS.	SPECIFICATION	DESCRIPTION	CODE	HEAT NO.
10	4	ASME SA 234 WPB per *	18" S/100 Cap	FUNH	95292

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	R
.20	.92	.012	.023	.23	—						55.5	80.5	30	

C-50-2536
C-50
10-28-75 BL

RECORD COPY

*Chicago Bridge & Iron Spec. MS 988
Rev. 0 and QAS 232 Rev. 0

ITEM	PCS.	SPECIFICATION	DESCRIPTION	CODE	HEAT NO.

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	R

PENETRATION SLEEVE
END CAP — No. X-15

H. Mebnalla
Checked
8-22-75

ITEM	PCS.	SPECIFICATION	DESCRIPTION	CODE	HEAT NO.

C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	N	YIELD KSI	ULTIMATE KSI	% EL.	R

CBI CONTRACT NOS. 73-5518/SU
BEL. MEL SUBCONTRACT NO. 8856-C-50
S.U. SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

ITEM	CHARPY (SIZE) V-NOTCH	TEMP. °F	FOOT-POUNDS	SHEAR	LATERAL EXPANSION
10	10 x 10 x 8	0°	42 47 42	44 50 40	.042 .044 .03

STARTING MATERIAL CONFORMS TO LADISH SPEC. 3F11 SEAMLESS PIPE WHICH HAS THE CHEMICAL & TENSILE PROPERTIES OF A106 GR
10 FITTINGS HAVE A MAXIMUM HARDNESS OF 197 BHN
FITTINGS CONFORM TO THE REQUIREMENTS OF MSS-SP75
10 STARTING MATERIAL CONFORMS TO ASME SA 516 Grade 70 as allowed by Code Case 1571
MAGNETIC PARTICLE INSPECTED AND ACCEPTED PER LADISH PROC.
ULTRASONICALLY INSPECTED AND ACCEPTED PER LADISH PROC.
LIQUID PENETRANT INSPECTED AND ACCEPTED PER LADISH PROC.
WELD(S) RADIOGRAPHICALLY INSPECTED AND ACCEPTED PER
FITTINGS ARE CAPABLE OF CONFORMING TO HYDROSTATIC TEST REQUIREMENTS OF

ITEM	TENSILE SPECIMEN
	STD. RD.
	FULL SEC.
	STRIP

ITEM	HEAT TREATMENT
	NOT REQUIRED
	STRESS RELIEVE 1100°F
10	NORM 1650°F (T.) 1750°F
	NORM 1750°F
	TEMPER 1300°F
	WATER QUENCH 1650°F
	TEMPER 1100°F
	WATER QUENCH 1650°F
	TEMPER 1200°F

RECEIVED
JUL 29 1975

NOTES

I hereby certify that to the best of my knowledge and belief this material analysis report is true and correct.

Sworn and subscribed to before me this 24th day July 1975 Lorraine Zajac

My commission expires August 22, 19

1-CO-R15A-B2

REVISED: 12-9-69	QUALITY ASSURANCE PROCEDURE LADISH CO., CUDAHY, WIS.	13 F 451 Rev. 1

HEAT TREATMENT

ALTERNATE DESIGNATIONS	SPECIFICATIO
A-105 Grade 1 & 2 A350 LF1 & LF2 High Yield Fittings A420 WPL1 PENETRATION SLEEVE END CAP - X-15	ASTM A234 Grade WPA-WPB-WPC

NOMINAL CHEMISTRY

CARBON	BORON	COBALT	COPPER
MANGANESE	IRON	TUNGSTEN	COLUMBIUM
PHOSPHORUS	NICKEL	TITANIUM	TANTALUM
SULPHUR	CHROMIUM	VANADIUM	
SILICON	MOLYBDENUM	ALUMINUM	

OPERATION	TEMPERATURE	INSTRUCTIONS
Normalize	1650°F. ±25°F.	Charge fittings into furnace operating @ 1650°F. Hold 20 minutes per inch at color o: 30 minutes minimum followed by a still Air Cool.
CBI CONTRACT NOS. 73-5518/3U BECHTEL SUBCONTRACT NO. 8856-C-50 SUSQUEHANNA STATION BERWICK, PENNSYLVANIA		NOTE: Any deviation or change in this procedure must be approved by Fitting Metallurgical Dept. Mgr. or his designated representative prior to performing treatment.
CHECK TEST BAR REQUIREMENTS		

— CHC
JUN 16 1975

RECEIVED
JAN 15 1975
GREENVILLE

SPECIAL INSTRUCTIONS:

Heat treat operation will be performed after all forming operations have been completed.

ISSUED BY	HEAT TREAT DIVISION	CHIEF METALLURGIST APPROVAL
H. WROBLEWSKI		R. D. BUSSARD

0440

FLCO 2536

944 PENETRATION SLEEVE
END CAP - NO. X-15

PHOENIX STEEL CORPORATION
CLAYMONT, DELAWARE

11081

CERTIFICATION ASME SA 516 GR 70 PVQ NORM. IMPACT TESTED PER A-593 CLASS 4 CLAYMONT, DEL. Nov. 16, 1973
HED @ -50 DEG. F.

CHEMICAL AND PHYSICAL TESTS OF Silicon Quality Steel — CUSTOMER'S ORDER NO. 569-HS1

CHARGED TO Hills Alloy Steel Co. — MILL ORDER NO. 26894-05
1.W. Interstate Rd.

SHIPPED TO Cleveland, Ohio 44146 — CAR NO. TRUCK — Bind Test OK

MELT No.	SLAB No.	SERIAL No.	Carb.	Mang.	Phos.	Sulph.	Si.	Cu.	Mo.	Thickness	Sec. Area	Yield Point lbs. Per Sq. In.	Tensile Strength Lbs. Per Sq. In.	% Elong. In 8"	SIZE
			Chemical Analysis							Test Piece					
			Vee-Notch Charpy Impact Tested @-50 Deg. F.												
35292-26	46548	574	.20	.92	.012	.023	.23	L-20-24-30		1.530		56000	79600	28.0	1 - 1-1/2

RECEIVED NOV 26 1974

Material and test pieces normalized at 1500-1650°F, hold for 1/2 hour per inch of thickness and air cooled.

Test pieces were reheated at 1500-1650°F, held for one hour per inch of thickness and air cooled

Ladish Co.
P.O. 59-1180
3 pcs 1-1/2 x 26 1/2 Dia

D. McBride 8-7-75

CBI CONTRACT NOS. 73-5518-3U
BECHTEL SUBCONTRACT NO. 8856-C-50
SUSQUEHANNA STATION
BERWICK, PENNSYLVANIA

True copy of original Certification on file at Ladish Co.
By [illegible]

SUBSCRIBED AND SWORN TO BEFORE ME

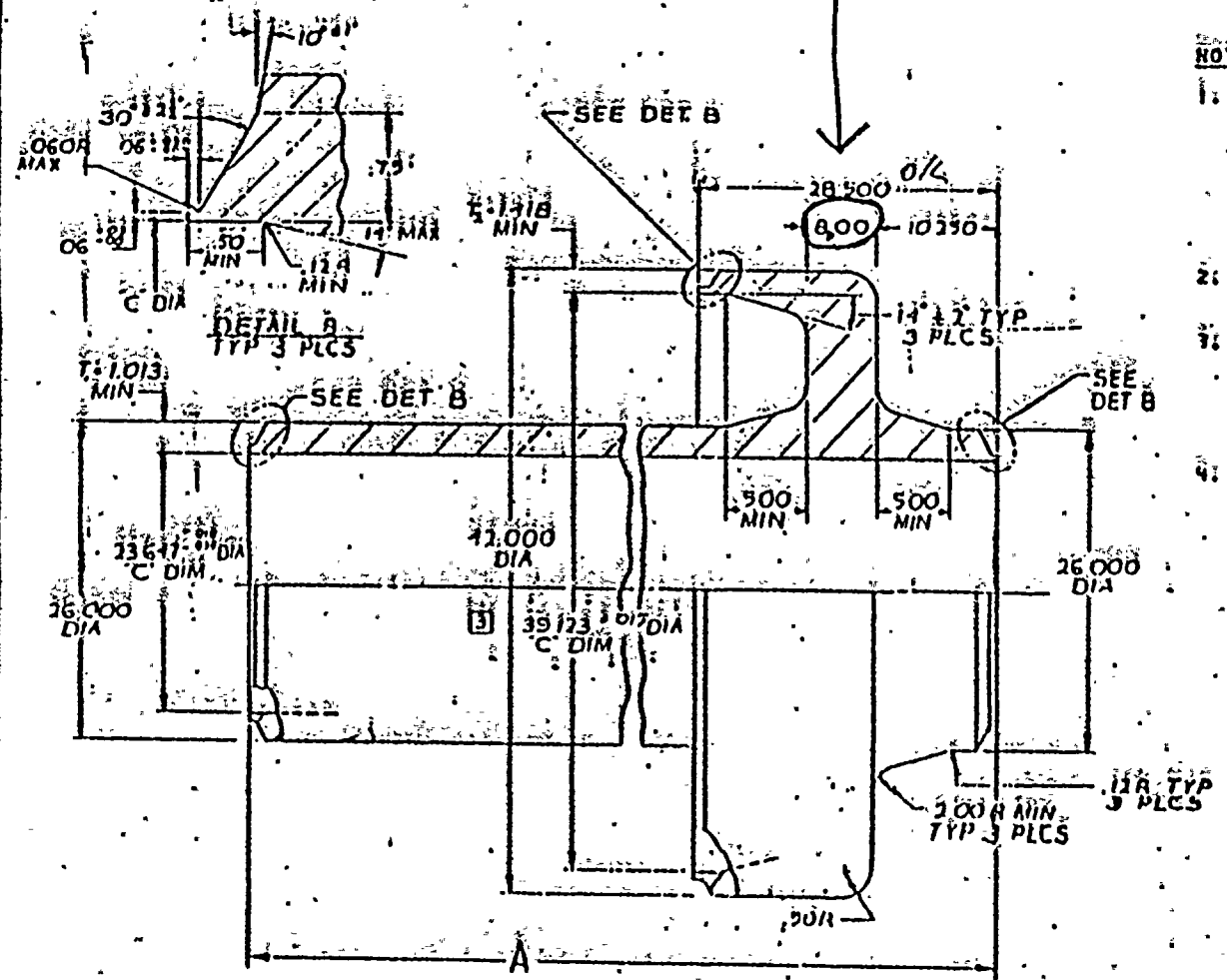
I certify the above figures are correct as contained in the Records of the Corporation

PIPE SPOOL

PIPE SPOOL
MAIN STEAM PIPING

FCF 7612 143 G1/G2

MAIN STEAM FLUED HEAD



NOTES:

1. PIPING SHALL BE SUPPLIED IN ACCORDANCE WITH:
   1.1 21A9416 STEAM LINE PIPING SPEC.
   1.2 11C4388 PIPING WELD.
   1.3 21A1566 STATE OF PENN. REQUIREMENTS.
2. DESIGN PRESSURE = 1250 PSIG
   DESIGN TEMPERATURE = 575° F.
3. HEAD FITTING MATERIAL SHALL BE PER NE-2310 & NC-2321 OF ASME SEC. III. CHARPY VEE NOTCH IMPACTS SHALL BE AT 0° F. (PER NB-2351).
4. ULTRASONIC EXAMINATION OF THE HEAD FITTING SHALL BE PER ASME SECTION III (PER NB-2542). MAGNETIC PARTICLE EXAMINATION SHALL BE PER ASME SECT. III (PER NB-2545).

Chd. 9-5-71
232

TABLE I

PART NO.	MARK NO	A	MATERIAL
			SVE SA 105 GR II
2	ITEM 15	16-9.75	(SEE NOTE 3)

NE 11391
NE 11217

NE 11415

A.P.E.D.
SAN JOSE

131 C 7612

6.5"

FM NO. 1034A

MAIN STEAM FLUED HEAD

NATIONAL FORGE COMPANY

TEST CERTIFICATION

M. W. KELLOGG CO.
QUALITY CONTROL
M.T.R. APPR'D
DATE 7/17/74

STOMER: The M. W. Kellogg Company

NATIONAL FORGE CO. ORDER: 60-7409

STOMER ORDER NO.: H-8775-9

SPECIFICATION: ASME Spec. SA350, Grade LF2, ES-11, Rev. 1 & ES-151, Rev. 6 & G.E. Spec. 21-A-1556, Rev. 2 and 21-A-9416, where applicable, & ASME Code, Sec. 3, NE-2310 & NE-2321

EM-SERIAL NO.: -001

ITEM: N42

DESCRIPTION: Main Stream Piping-Flued Head forging, Drawing 131-C-7692, Rev. 2

ITEM-SERIAL	HEAT NO.	C.	Mn.	P.	S.	Si.	Ni.	Cr.	Mo.	V.
-001	21-3029	.27	1.00	.011	.016	.24	.25	.13	.06	.04

TEST	ULTIMATE TENSILE STRENGTH (P.S.I.)	YIELD PT (P.S.I.)	% ELONGATION	% REDUCTION OF AREA	%SHEAR	CHARPY IMPACT (FT. LBS.)	LAT. EXP.
						@ -0°F	
-001	77,000	61,500	30.5	73.3	45%	89.0	.072
					38%	64.0	.062 12:00
					40%	69.5	.065
					34%	61.5	.056
					34%	57.5	.055 6:00
					37%	41.0	.043
						@ -50°F	
					10%	6.0	.005
					13%	11.0	.009
					13%	13.0	.010

LECTRIC MELT VACUUM DEGASSED STEEL
OLUTIONTITIZED @ 1580°F for 11 hrs, QUENCHED IN WATER
EMPERED @ 1240°F for 11 hrs
RAIN SIZE 6-8
EAT TREAT PROCEDURE HTLC-7409-64
REE OF MERCURY CONTAMINATION
OUND FLUTED INGOT MOLD

State of Pennsylvania
Warren County } ss:

Before me, a Notary Public in and for above County, personally appeared N. C. Baxter, Jr. of the National Forge Company, who being duly Sworn according to Law, deposes and says that the above Report is a true and correct copy of tests as contained in the records of the Company.

N. C. Baxter, Jr.

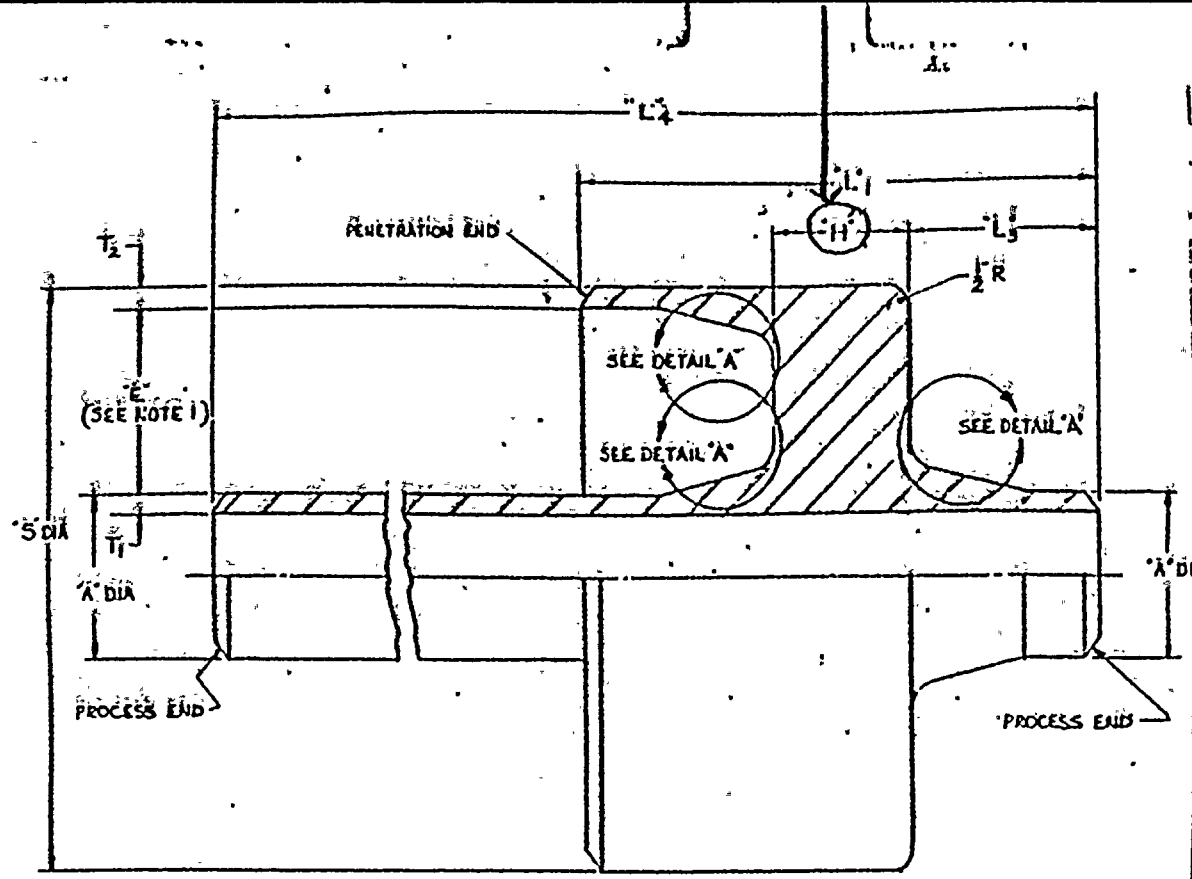
Subscribed and Sworn to this 12th day of July 19 74

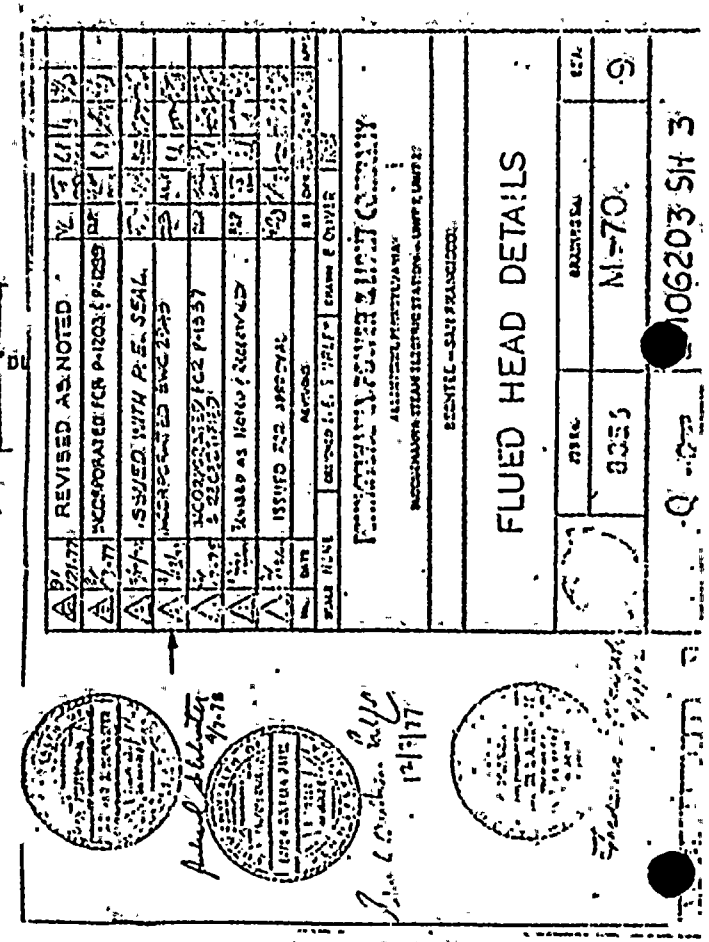
Sally L. Vevers

My Commission expires

Notary Public Seal
My Commission Expires January 2, 1978
SALLY L. VEVERS

FEEDWATER SYSTEM
FLUED Head





TYPE 1 - ONE PIECE DESIGN
FLUED HEAD - NUCLEAR CLASS 1 & 2
SUBJECT TO VOLUMETRIC INSPECTION
ASME CODE SECT. II

• S.E. TO SPECIFY

ITEM	FLUED HEAD IDENTIFICATION NO.	SERVICE DESCRIPTION	PROCESS PIPE: PIPE CLASS	PRESSURE (PSIG) NORMAL/DESIGN	TEMPERATURE (°F) NORMAL/DESIGN	AXIAL OR OFFSET LOAD (LBS)	TORSIONAL MOMENT (FT-LBS)	ASME B & PV SECTION CLASS	MATERIAL	TYPE	NOMINAL SIZE: PIPE	SLEEVE	DIMENSIONS: L1	L2	L3	L4	E	T1	D ±.015	A	S ±.000/.000	G	H	U	S	INSPECTION END	INSPECTION END	WT. LBS
11/12	X-8	MAIN STEAM DRAIN LINE	DBA	1000/1230	545/595	LATER	LATER	1	SA-105	1	4"	12"	11.312"	—	3.125"	10'-6"	Sch. 160	0.438"	—	1.500	—	2.30"	3.00"	0.625	[illegible]	2	3	—
13/14	X-9A, B	FEEDWATER	DLA	1125/1775	337/546			1		1	24"	42"	29.500	—	10.250	13'-4½"	Sch. 100	2.143"	—	24.000	—	5.00"	5.00"	2.000	42.000	3	3	35
15/16	X-10	MAIN STEAM TO AUXILIARY	DBA	1000/1230	545/595			1		1	4"	18"	14.378"	—	3.314	10'-11½"	Sch. 80	0.562	—	4.500	—	3.40"	3.75"	0.750	9.000"	2	3	—
17/18	X-11	MAIN STEAM TO AUXILIARY	DBA	[illegible]	545/595			1		1	10"	24"	15.627"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]

(Canada) Ltd.

Sorel, Quebec Canada
514/743-7811

RELEASE CERTIFICATE

FEEDWATER SYSTEM
FLUed HEAD

Date Oct. 23, 1974

Our Order No. 4-31,558 TO: Tubo Turns Specification BA-541-71 Cl. I Modified per Code Case 1332-6

Cust. Order No. 49939 P.O. Box 987 UT to UT-04-024

Material CMU-145 Louisville, Ky. 40201 Conditions Quench & Temper

Item No.	Size	Quantity	Heat No.	C	Mn	P	S	Si	Ni	Cr	Mo	V		
7	Dwg. 76711-01.0 Rev. 3	1	43130-1	.25	1.34	.021	.024	.24						
	K-2A69													
	(Flued head - Feedwater X9A)													

MECHANICAL TESTS

Item No.	Yield Strength per sq. in. 0.2%	Tensile Strength per sq. in.	Elong. % Kt 2"	Red. of Area %	Charpy V Notch Impact ft lbs -320°F	Hardness BHN	Remarks
	51,500	80,000	34	69.5		163	Material ultrasonically inspected per TT-0
Charpy V Notch	FT-LBS 0°	100°	SHEAR (Info only) 0°	100°	LAT. (Info only) 0°	100°	024. No indications to be reported.
1	86	69	98	50	.036"	.024"	Witnessing waived by H. Hiemler
2	76	98	70	70	.032"	.030"	
3	89	70	80	50	.060"	.039"	Charts enclosed

The foregoing results shown in this report are correct to the best of our knowledge and belief.

MAIN STEAM ISOLATION VALVE DIMENSIONAL CHART (WALL THICKNESS)

BODY

nsions shown are actual minimum ... for each section (ABCD) as ...d at A&M final inspection and ...d by a customer representative ... assembly.

...Wall Dwg. req. 15/16"

...WALL.

...al Min. value quadrant "A". 2"

...al Min. value quadrant "B". 2"

...od of measurement CALIPER & SCALE

Q.C. Accept. 3-29-74

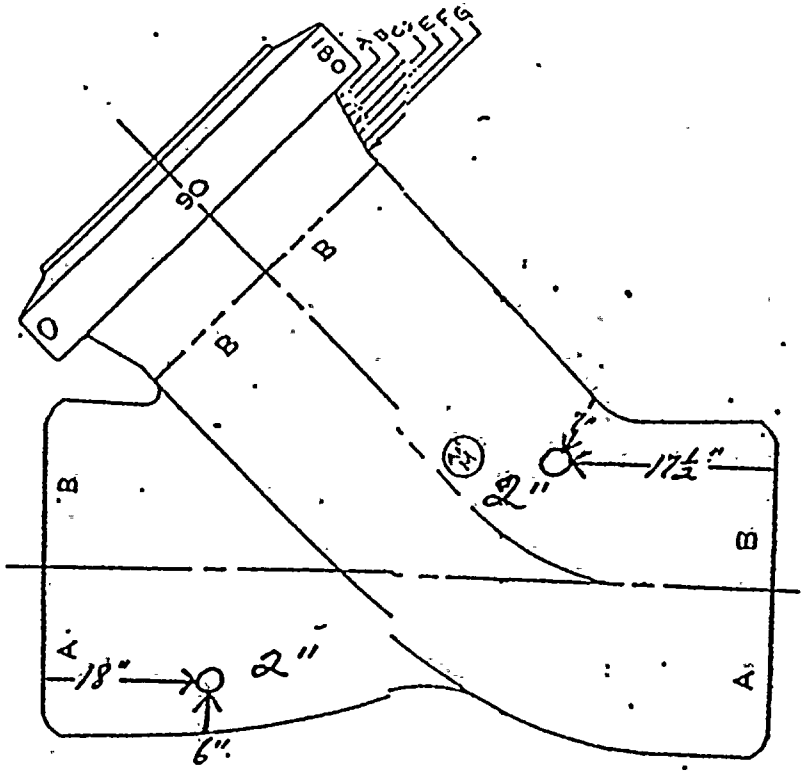
Q.C. Accept. 3-29-74

Dim... per Dwg. No. 21183-H Rev. 4

In...	0° to 90°	90° to 180°	180° to 270°	270° to 0°
...inal				
...ind				
...ind	3 5/8	3 9/16		
...ind	3 1/4	3 1/4		
...nd	3	2 15/16		
...nd	2 29/16	2 3/4		
...nd	2 5/8	2 9/16		

Q.C. Accept. 3-29-74

Q.C. Accept. 3-29-74



DRAG SIDE

1. A&M S.O. No. 22221-01
2. Cust. P.O. No. 205-AD 114
3. Drawing No. 21183-H Rev. 4
4. A&M Valve Ser. No. SIN 8-221
5. Radiographic No. 1788
6. Heat No. F9930
7. A&M Q.C. 3-29-74
8. Cust. Q.C. 3-29-74
9. Other

COVER FLANGE THICKNESS

Min. Dwg. req. 4 7/8"

Actual Min. value 0° to 90°. 4 11/16"

Actual Min. value 90° to 180°. 4 11/16"

Method of measurement SCALE

A&M Q.C. Accept. 3-29-74

G.E. Q.C. Accept. 3-29-74

SK 3733 Rev. 9

A&M-QC-F-131 Rev. 1

MAIN STEAM ISOLATION VALVE DIMENSIONAL CHART (WALL THICKNESS)

BODY

...s listed are actual ...ness dimension for each ...(inch) as recorded at A&M final ...and verified by a customer representative, per assembly:

Overall Dwg. req.: 1 25/32"

...al Min. value quadrant "C" 1 15/64"

...al Min. value quadrant "D" 2 15/64"

...d of measurement: CALIPER, SCALE

...M Q.C. Accept: A&M QCS 3-29-74

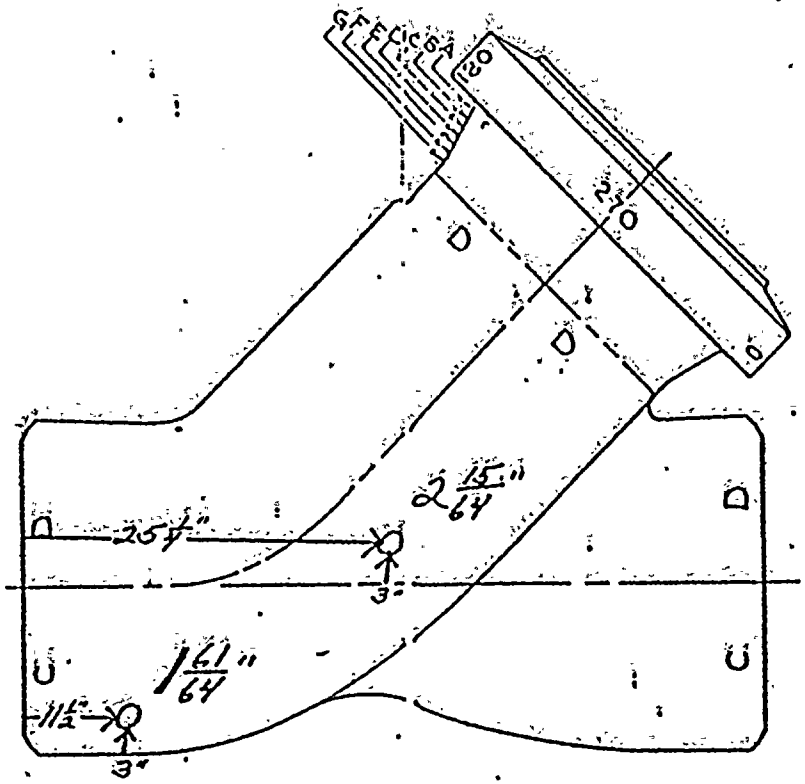
...E. Q.C. Accept: R.E.C. 3-29-74

...n. Dims. per Dwg. No 21183-H Rev. 4

...n.	0°	90°	180°	270°
Band:				
Band:				
Band:	3 2/16			3 1/32
Band:	3 9/32			3 3/8
Band:	3 2/32			3 1/4
Band:	3"			3 1/8
Band:	2 7/8			3"

...M Q.C. Accept: A&M QCS 3-29-74

...E. Q.C. Accept: R.E.C. 3-29-74



COPE SIDE

1: A&M S.O. No: 12221-01

2: Cust. P.O. No: 205-AD114

3: Drawing No 21183-H Rev. No. 4

4: A&M Valve Ser. No: S/N 8-221

5: Radiographic No: 1788

6: Heat No: F9930

7: A&M Q.C. A&M QCS 3-29-74

8: Cust. Q.C. R.E.C. 3-29-74

9: Other

COVER FLANGE THICKNESS

Min. Dwg. req: 4 1/4"

Actual Min. value 180° to 270° 4 11/16"

Actual Min. value 270° to 0° 4 5/16"

Method of measurement: SCALE

A&M Q.C. Accept: A&M QCS 3-29-74

G.E. Q.C. Accept. R.E.C. 3-29-74

Report of Chemical Analysis and Physical Properties

C.E. 205 A114
Susquehanna I

CUSTOMER Atwood & Morrill Co. ORDER No. AM-10500 FILE No. MSIV BODY

ADDRESS PATTERN No. 16614-38147-001 DESIGNATION 070

ATTENTION OF SPECIFICATION ASME SA216 Gr WCB DATE 7-17-73

Cast No.	C	Mn	Si	P	S	Cr.	Ni	Mo			Yield P. S. I.	Tensile P. S. I.	Elong. Per Cent.	Red. of Area Per Cent.	Ctg Serial #	C.T. Serial #
9234	.28	.70	.49	.017	.013						48,000	79,500	26.5	47.2	F9234-1	K38
															S146-221	

We hereby certify that the material furnished on the above order meets all requirements of the material specifications and all applicable special requirements of Article NB-2000 of the ASME Section III, Boiler and Pressure Vessel Code dated July 1971 and 1971 Summer Addenda.

CHEMICAL & PHYSICAL REPORT CHECKED

DATE 2-26-74

REMARKS: 7-17-73

Authorized Inspector, Robert A. Bratt 2/26/74

7-26-74

ARMY O.C.S. 11-27-73

ATWOOD & MORRILL CO. "I certify the above information is correct."

QUAKER ALLOY CASTING CO.

BY Mark H. Landis
METALLURGIST

ELLOY CASTING CO. HEAT TREATMENT RECORD MSIV BODY (NORMALIZE)

: ATLAS 4 AIRFIL DATE 2-24-72

: ORDER NO. AN 10500 CONTRACT NO 205B1142/12221-01

NO. 1414-30147-001 DESCRIPTION 26" BODY S/N 6-221 Susquehanna I

SPECIFICATION AND GRADE ASME SA216 GR WCB

BER F9234 CASTING SERIAL NUMBER F9234-1

ATMENT PROCEDURE QPP HT(A-1)-1 REV. C R. T. NUMBER K3088

ATMENT PROCESS NORMALIZE

AT FURNACE FLYNN & DREFFEIN CHARGE NO. F21-A

EMPERATURE 1030°F

EQUILIBRIUM TEMPERATURE 2 HRS 55 MIN

TEMPERATURE RANGE 1690°F to 1700°F

TEMPERATURE 7 HRS 15 MIN

DATA AIR

ACTUAL HEAT TREAT CHARTS IS RETAINED AT QUAKER ALLOY, EMMERSTOWN, PA.

ATED BY: B. RUTH

BY: Paul R Rittenhouse 7-9-73

QUAKER ALLOY CASTINGS CO. DATE

Q.C. DEPT.

INSPED QC

V.H.B. 12-1-73

11-27-73

MSIV-Body

ER ALLOY CASTING CO. HEAT TREATMENT RECORD TEMPER

TOMER ATWOOD & MORRILL DATE 2-8-73

CUSTOMER ORDER NO. A11500 CONTRACT NO. 205 A11-4 / 12221-6

ITEM NO. 1114-30147-001 DESCRIPTION 26" BODY S/N 6-221 Susquehanna I

ERIAL SPECIFICATION AND GRADE ASME SA216 GR WCB

T NUMBER F9234 CASTING SERIAL NUMBER F9234-1

T TREATMENT PROCEDURE QAP WT(P-1)-1 REV C R. T. NUMBER K3088

T TREATMENT PROCESS TEMPER

T TREAT FURNACE FLYNN & PREFINN CHARGE NO. FD249

RGE TEMPERATURE 150°F

E TO EQUILIBRIUM TEMPERATURE 2 HRS 10 MIN

DING TEMPERATURE RANGE 1340°F to 1370°F

E AT TEMPERATURE 8 HRS 10 MIN.

LING DATA AIR

MARKS

ACTUAL HEAT TREAT CHARTS IS RETAINED AT QUAKER ALLOY, MYERSTOWN, PA.

T TREATED BY: B. RUTH

ORDED BY: Paul R. Hanch 7-10-73

QUAKER ALLOY CASTING CO. DATE

TLE: Q.C. DEPT.

APPROVED QC 12-1-73

MINIMUM THICKNESS VERIFICATION
PER A&M SK3733 Rev. 9

MSIV COVER

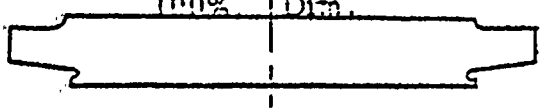
Customer G.E. SAN JOSE Cust. P.O.# 205AD114 A&M S.O.# 12221-01

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 4 1/4"

Act. Dim. 4 5/16"

DISC / COVER
100% Dim.



A&M Ser. No. 8-221

A&M Q.C. 3 A 3-15-74

A&M D. 3-15-74

Method of Measurement. SCALE

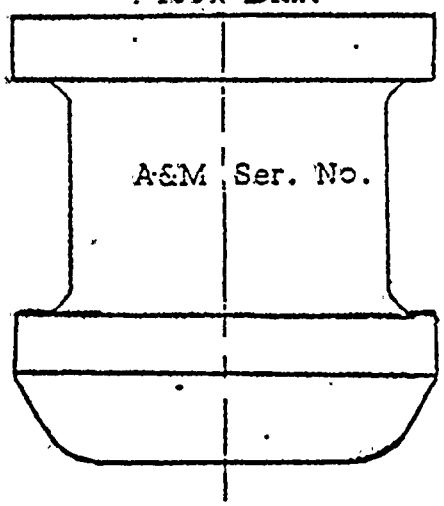
G.E. R.E.C.

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 5 7/8" & 3 1/2" DIA.

Act. Dim. 6 1/16" & 3 1/2"

POPPET
100% Dim.



A&M Ser. No.

Method of Measurement.

SCALE

A&M Ser. No. 6-221

A&M Q.C. 3 A 3-21-74

A&M

BWRPD-QC 3-21-74

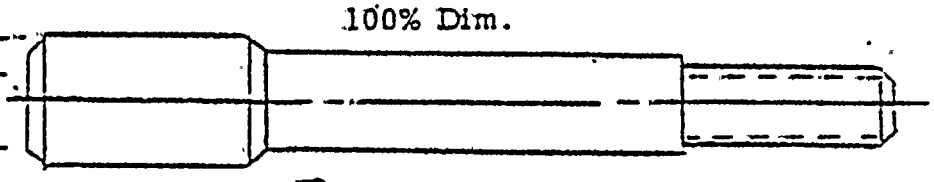
G.E. R.E.C.

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 2"

Act. Dim. 2"

STEM
100% Dim.



Method of Measurement. SCALE

A&M Ser. No. 8-221

A&M Q.C. A&M Q.C. 3 A DATE. 3-11-74 CUST. Q.C. BWRPD-QC R.E.C. DATE. 3-11-74

Def. 12221-01-01-1
MSIV COVER
.8 Top Covers

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Composition:

S/N 6-221

Date 4-25-73

		Customer's Order No.	Cann & Saul Order No.
Customer	ATWOOD & MORRILL CO., INC.	AM-10259	15300
Address	285 CANAL ST. SALEM, MASS. 01970	GE #205-AD -114 Susquehanna I	

AE&H's S/N's 1-221 thru S/N 8-221

Attention PURCHASING DEPT.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CB
6063582	.26	.84	.015	.024	.22				

Lab. No.

PHYSICAL TESTS

TEST FROM	TEST NUMBER		GAUGE	YIELD PT. LBS.	YIELD PER Square In. Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG %	REDUCED AREA	Reduction %
Forging	15300	1	.505	9,100	45,500	15,200	76,000	32.0	.089	55.5

OTHER TESTS

SONIC A388 REV. 9 4-19-72:- O.K. See report
MAG. PART. B & PV #4 6-15-72:- O.K. See report
Heat treated to C&S Heat Treat Procedure #1, Rev. 1 dated 2-13-73

We certify the material meets the requirements of NB-2000 & ASME SA-105.

APPROVED B.C. 2-26-74

APPROVED M.H.S.

WITNESSED MT 4-24-73
4-25-73

CHEMICAL & PHYSICAL REPORT CHECKED

Customer's Specifications: ASME SA-105, GR. 2

Y.P.	36,000
T.	70,000
E.	22%
R.	30%

26/30 CARBON

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

DATE 4-25-73
ATWOOD & MORRILL CO. INC.

8 — TOP COVER FORGINGS PER PART 30842-817-2972CKBX ON DWG. 21080-D ALT. 0
(Contains serial numbered 51 to 58 inclusive.)

Delivered for Inspection 4-24 & 25-73
ATWOOD & MORRILL CO.

Inspection

Inspector

APPROVED REB 3-20-73

CANN & SAUL STEEL CO.

Engr. of Tests

S.O. 72227-01
8 Covers
Ae m's SIN's 1 Thru 8
S/N 6-221

MSIV COVERS
NORMALIZE

2/3/73
1650 F - 8 Hrs. Cool in S ill Air
Atwood & Morrill Co., Inc.
Alt-10259
8 - Top Cover Forgings per Part 30842-817-2972C
on D g. 21080-D Alt. 0
(Forgings serial Numbered 51 to 58 incl.)
Heat Treat Proc. C&S #1, Rev. 1, dtd. 2/13/73
Heat No. 6068582

Cann & Saul Steel Co.

Eng. of Test

APED QC
REB
3-20-73

BY APD QC
R.E.C.
2-25-74

HN 371

MINIMUM THICKNESS VERIFICATION
PER A&M SK3733 Rev. 5

MSIV POPPETS

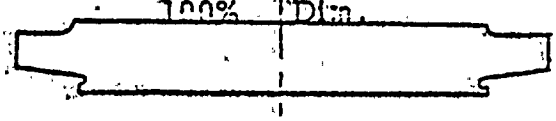
Customer G.E. SAN JOSE Cust. P.O.# 205AD114 A&M S.O.# 12221-01

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 4 1/4

Act. Dim. 4 5/16"

DISC / COVER
100% Dim.



A&M Ser. No. 8-221

A&M Q.C. 3-15-74

A&M R.E.C. 3-15-74

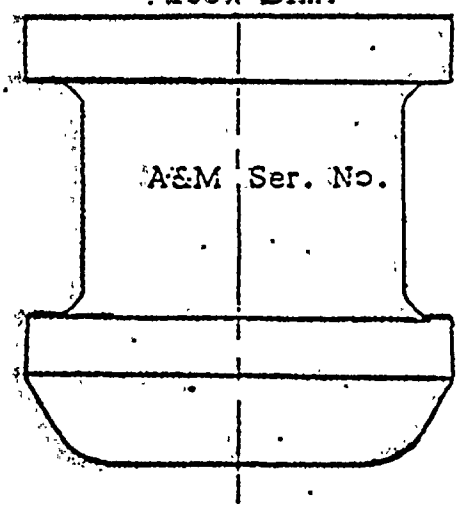
Method of Measurement. SCALE

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 5 7/8" & 3 1/2" DIA.

Act. Dim. 6 1/16" & 3 1/2"

POPPET
100% Dim.



A&M Ser. No.

Method of Measurement.

SCALE

A&M Ser. No. 6-221

A&M Q.C. 3-21-74

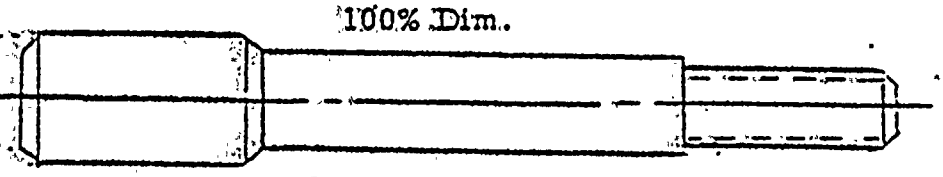
A&M R.E.C. 3-21-74

Dwg. No. 21283-H Rev. # 4

Dwg. Dim. 2"

Act. Dim. 2"

STEM
100% Dim.



Method of Measurement. SCALE

A&M Ser. No. 8-221

A&M Q.C. DATE. 3-11-74 CUST. Q.C. DATE. 3-11-74

12221-01-002 ✓

(B) Poppets

MSIV Poppets

S/N 1 Thru 8-221

CANN & SAUL STEEL CO.

ROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

Date 4-25-73

Customer: Atwood & Morrill Co., Inc.
285 Canal St.
Address: Salem, Mass. 01970

Customer's Order No.: A-10259
GE #205-AD-114
Susquehanna II

Cann & Saul Order No.: 15301
J/M 7221

Attention: Purchasing Dept.

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CU		
211211	.26	.72	.010	.021	.21						

Lab. No.

PHYSICAL TESTS

OUT FROM	TEST NUMBER		GAUGE	YIELD PT. LBS.	YIELD PER Square In. Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG IN %	REDUCED AREA	Reduction %	B.H.N.
rging	15301	1	.505	9,200	46,000	15,300	76,500	31.0	.087	56.5	

CHEMICAL & PHYSICAL REPORT CHECKED
BY
DATE 6-20-73
ATWOOD & MORRILL CO. INC.

OTHER TESTS

nic A388, Rev. 9 4/19/72:- O.K. See report
g. Part B&PV #4 6/15/72 :- O.K. See report
at Treated per C&S Heat Treat Procedure
, Rev. 1 dated 2-13-73

2-25-74

We certify the material meet the requirements of NB-2000 ASME SA-105 Gr. 2

4-24-73

WITNESSED MT 4-25-73

Customer's Specifications: ASME SA-105, Gr. 2 (.30 C Max.)

/30 Carbon B.H.N.

Y.P.	36,000
T.	70,000
E.	22%
R.	30%

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

Poppet Forgings per Part 30521-801-2972-D Alt. 6 on Dwg. 20886-D, Alt. 4
(Forgings serial numbered 51 to 58 incl.)

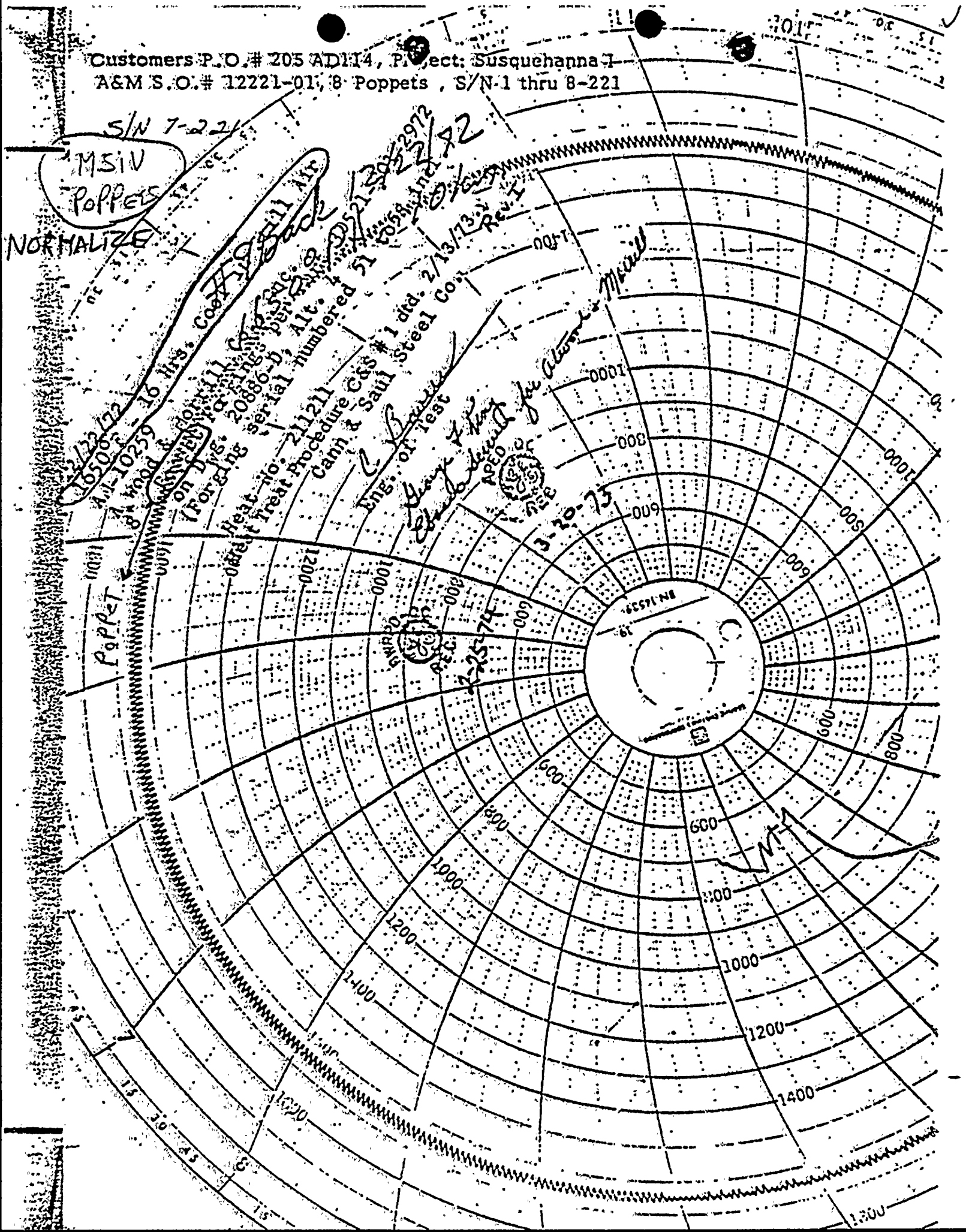
S/N 1-221 through S/N 8-221

Inspection

CANN & SAUL STEEL CO.

3-20-73

Customers P.O. # 205 AD114, Project: Susquehanna I
A&M S.O. # 12221-01, 8 Poppets , S/N 1 thru 8-221



D.E. DYSON AND SONS, INC. CERTIFIED TEST REPORTS

P.O. # 205 AD 114
Proj. Sus Q. I

P.O.# AM-13011 [MSIV STUDS, NUTS]
S.O.# A-1654
Heat # 3261560 & M70857
Reference: 12221-01-027 Stud
12221-01-031 Nuts

Atwood and Morrill Co.
285 Canal Street
Salem, Massachusetts 01970

ITEM NO. 1. 160 Pcs. 2" – 8 UN3A x 11-3/4" Long Studs Dwg. 25307A
Brisch Code No. 34258-255-3231

SPECIFICATIONS: ASME SA-193 B-7 p1.27
ASME Sec. III, 1971 NB-2000

MATERIAL: (4145 Steel per ASME SA193 B-7)
HEAT NO. 3261560- Code No. A-60

CHEMISTRY: C-.44 Mn-.79 Phos-.014 Sul-.019 Sil-.26 Cr-.95 Mo-.16

PHYSICAL TEST:

Tensile	Yield	Elong	Red.	BHN	Temp
131,050	112,325	20.5	65.4	269	1180°F

HEAT TREAT DATA:

Austenitzed at 1600°F	40 Min.
Tempered 1180°F	80 Min
Stress Relieved 1080°F	80 Min

MAGNETIC PARTICLE INSPECTION:
Inspection performed in accordance with approved procedures UL-6, Supplement 18, and in accordance with ASME Sec. III 1971, Para. NB-2583, Including Addenda thru Summer 1971

RESULTS: All items acceptable

We certify that the material referenced herein meet all the requirements of the material specifications and the applicable special requirements of Article NB-2000 of the ASME Boiler and Pressure Vessel Code Section III, 197.

ITEM NO. 2. 160 Pcs. 2" – 8 UN2B ASH S.F. Hex Full Nuts
Brisch Code No. 21838-099

SPECIFICATIONS: SA-194 Gr. 2H p1.31
ASME Sec. III, 1971 Boiler and Pressure Vessel Code NB-2000

MATERIAL: Heat # M-70857 Code A 57

CHEMISTRY: C-.47 Mn-.68 Phos-.011 Sul-.019 Sil-.21

CHEMICAL & PHYSICAL REPORT CHECKED
BY [signature]
DATE 1-16-74
ATWOOD & MORRILL CO.

-CONTINUED-

REC'D 2-25-74

JOS. DYSON AND SONS, INC. CERTIFIED TEST REPORTS
Atwood and Morrill Co.

November 20, 1973 MSIV
Page 2 of 8 NUTS
P.O. # AM-13011
S.O. # A- 1654
Heat # 3261560 & M70857
Reference: 12221-01-027 Stud
12221-01-031 Nut

P.O. 205 AD 114
Susq. I

ITEM NO. 2 (Continued)

HEAT TREAT DATA: Heated to 1550 °F - 2 Hrs. at Heat - Oil Quenched
Tempered at 860 °F - 2-1/2 Hrs. at Heat - Air Cooled

HARDNESS: Per Para. 8.1 - 269/285
Per Para. 8.2 - 223/230

CONE STRIP TEST Proof Load - 194,000 Lbs. - Satisfactory

MAGNETIC PARTICLE INSPECTION:
Inspection was performed in accordance with approved procedures UL-6, Supplement 19 and in accordance with ASME Sec. III, 1971 Para. NB-2583 Including Addenda thru Summer 1971.

RESULTS: All items acceptable

We certify that the material referenced herein meet all the requirements of the material specification and the applicable special requirements of ASME Boiler and Pressure Vessel Code Sec. III, 1971 Para. NB-2000

THE ABOVE TESTS CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS LISTED - THIS CERTIFICATE NOTARIZED ONLY WHEN REQUIRED.

I, Robert A. Murkey, a Notary Public do hereby certify that this affidavit was subscribed to before me by a duly authorized agent of JOS. DYSON AND SONS, INC. this 20th day of November, 1973

June 8, 1977
My Commission expires:

Robert A. Murkey
Lake County, Ohio
Notary Public

We hereby certify that the foregoi data is a true copy of the data fur ished us by the producing mill or data resulting from tests performe in the Dyson Laboratory.

JOS. DYSON & SONS, INC.

By: Authorized Agent
ART MAZZARELLA
Quality Control Manager

Studs

50# 11-1920

Crucible Cutwell
Part No. 13011
MSIV STUDS

Crucible sp 11.100 REV. 4/71

Colt Industries Crucible Inc
ALLOY DIVISION, MIDLAND, PA. 15059

2 GGB

GRADE	PROD	MFG	CUSTOMER CODE	SHIPPED FROM	DATE SHIPPED	INSTRUCTIONS
4145	377	052	388725-01	MIDLAND PA	06/23/3	1 CT W/SHPT SHC CHEM ON SHPG PPRS REPORT RESULTS OF ALL TESTS 1 CT TO C LEVE DIST

SOLD TO: JOS DYSON & SONS INC
53 FREEDOM ROAD
PAINESVILLE OHIO. 44077

SHIP TO: X

PAPERS		B.H.	S.H.	CT	HV	M.A.	MEC	NTZ
	SOLD	1	1	3	3	Y	Y	Y
	SHIP					N		

ZIPM	CUSTOMER ORDER NO.	OUR ORDER NO.	DESCRIPTION	SIZE
CP-2925 01-15		632100573	TOC 4145 OH HT MS SRTRN GRND & PCL ALY STL. BARS	ASTM 193-87 2 RD R/L

HEAT NO.	C	MN	P	S	SI	CR	MO
H 3261560	.44	.79	.014	.019	.26	.95	.16

HEAT #	COIL #	QUANTITY	GRAIN	HARDNESS	YIELD	TENS.	BRD	CCEFAC	ELONG	RED	RA %	CHAR	IZOD
3261560 H		5810		BHN 269	112325	131050		OK	20.5		65.4		

Meets Requirements of SA-193-B7

ANNA FEDORKO, Notary Public
MIDLAND BOROUGH, BEAVER COUNTY
MY COMMISSION EXPIRES MAY 12, 1975

R. Bratt 1/22/74
Authorized Inspector

SWORN TO AND SUBSCRIBED BEFORE ME
THIS 28 DAY OF June 19 73
NOTARY PUBLIC

Colt Industries Crucible Inc

CERTIFICATE OF TEST

THE TEST RESULTS SHOWN IN THIS REPORT ARE CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF

COLT INDUSTRIES CRUCIBLE INC
CERTIFIED BY
REPRESENTATIVE

S.O. 12221-
G.E. 205AD114, Seq. I

MSIV Studs

Sept 21, 1920

Carmen Cornell
Dec 21, 1920

ALLOY DIVISION, MIDLAND, PA. 15059

9 GGB

PROD	MFG	CUSTOMER CODE	SHIPPED FROM	DATE SHIPPED	INSTRUCTIONS
5377	552	388725-01	MIDLAND PA	06/23/73	1 CT W/SHPT SHC CHEM ON SHPG PPRS REPORT RESULTS OF ALL TESTS 1 CT TO C LEVE DIST

JDS DYSON & SONS INC
53 FREEDOM ROAD
PAINESVILLE OHIO 44077

SHIP TO: X

PAPERS		O.L	S.N	CT	INV	H.A	PAD	MTZ
	SOLD	1	1	3	3	Y	Y	Y
	SHIP					N		

CUSTOMER ORDER NO. -2925 01-15

OUR ORDER NO. 832100573

DESCRIPTION: TOC 4145 OH HT HS SRTRN GRND & PCL ALY STL BARS

SIZE: ASTM 193-87

2 RD RL

T.NO	C	MN	P	S	SI	CR	MO
1560	.44	.79	.014	.019	.26	.95	.16

#	COIL #	QUANTITY	GRAIN	HARDNESS	YIELD	TENS.	BND	CCLFAC	ELONG	RED	RA	CHAR	IZOD
1560		.5810		BHN 269	112325	131050		OK	20.5		65.4		

Meets Requirements of SA-193-B7

ANNA FEDORKO, Notary Public
MIDLAND BEAVER COUNTY

R. Bratt 1/22/74
Authorized Inspector

United States Steel Corporation

S.O. 12221-01

MAR 29

MSIV - (Nuts)

Customer Order	U.S.S. Order No.	Invoice Date	INVOICE NO.
3000 1/24/73	DC373C5 AE D27 6213 39	03-13-73	154 35222

Invoice No.	Shipper's No.	Shipped Date	Shipped From	Routing
M35423	03-12-73	GARY WORKS GARY, INDIANA	PPD3972610	HENNIS FRT

Sold To

JOSEPH CYSCN & SONS INC
53 FREEDOM RD
PAINESVILLE OHIO 44077

Ship To

JOSEPH CYSCN & SONS INC
FASTNER DIV
FREEDOM & NEWELL ST
PAINESVILLE OHIO 44077

22000

30-1/2-10

Item No.	Description	Quantity
BARS 1-7 SC 1045		
RT OR SWCRA S/A		
02 2 1/4 RD 13.51# 8FT 6 IN		P2
PCS HEAT# BDLS LFTS 352 M70857 6	8 FT 6 IN	42050
TRANSPORTATION CHARGE	PER CWT	42050

HEAT NO	C	MN	P	S	SI
M70857	.47	.68	.011	.019	.21

V.G. Tales, A&M Q.C. 16/30/74

National Morrell Co

PO# AM13011

Nut Material

UP GRADED TO

A-194 Gr 2H SPEC

SHIPPING NOTICE ONLY

BWRPD-OS R.E.C. 2-25-74

We hereby certify that the chemical analyses (and/or tests) shown are correct as contained in the records of the company.

Chief Metallurgist
D. A. HAYES

R. Bratt 1/22/74
Authorized Inspector

PCS 352 BDLS LFTS 6

WT. 42050
16 32

42050

CERTIFICATION OF HEAT TREATMENT

CERTIFICATION
S.O. 12221-01
P.O. 205AD114
№ 389
Sequehanna

NETTLETON STEEL TREATING CO.

1371 EAST FORTY-FIFTH STREET
CLEVELAND, OHIO 44103
TELEPHONE: 431-9500

SOLD TO
JOS. DYSON & SONS, INC.
33300 LAKELAND BLVD.
EASTLAKE, OHIO 44094

SHIPPED TO
SAME AS SOLD TO UNLESS OTHERWISE INDICATED

Customer Order No.	Date Received	Containers	Material	Part No.	Pcs.	Weight	Date Shipped
DP-3376	5-8-73		1045		540	3.94#	

Shop Order No.	Description
10905	2 1/4" hex nut blanks Ref A4534-A1554-A1970AM and A494-B Heat number 170357

MSIV Nuts

SPECIFICATIONS: Heat treat to 269/235 BHN
per A194 Gr2H
Heat charts

Clifford Morrell

WE CHECKED 8 PCS. ON THIS LOT. CHECKED 100% _____ METHOD _____

RESULTS:	PIECES	HARDNESS
	8	3.60-3.65-2M

BWRPD-QC REC. 2-25-74

We hereby certify that these parts have been heat treated to the above specifications.

Very truly yours,
NETTLETON STEEL TREATING CO.

William Lewis
(Authorized Signature)

HERRON TESTING LABORATORIES, INC.
TESTING · INSPECTION · ANALYSIS
CLEVELAND, OHIO 44131

MSIV

Pg. 8 of 8

Shipper No. 11944
Purchase Order No. DP 2315
Lab. No. H 2957
Date 4 January 1974

Test of 2"-8 TPI, 1045 Steel F.M. Hex Nut Per ASME SA-194, Gr. 2H, Heat No. M70857, S.O. No. A1654-A.N., A4534-A.N. & A1920-A.N.

For JOSEPH DYSON & SONS, INC.
Attn: Mr. Art Mazzarella

No. of Sheets _____ Sheet No. _____

S.O. 12221-01

P.O# 205AD114

CONE STRIPPING PROOF LOAD (194000 LB.)	BRINELL HARDNESS PER PARA. 8.1
SATISFACTORY	262
SATISFACTORY	262
SATISFACTORY	262

CONE STRIPPING PROOF LOAD BASED ON CPL EQUATION.

CANNOT BE USED FOR EXTRAPOLATING VALUES BEYOND 1-1/2".

MEETS MECHANICAL REQUIREMENTS OF ASME SA-194, GR. 2H.

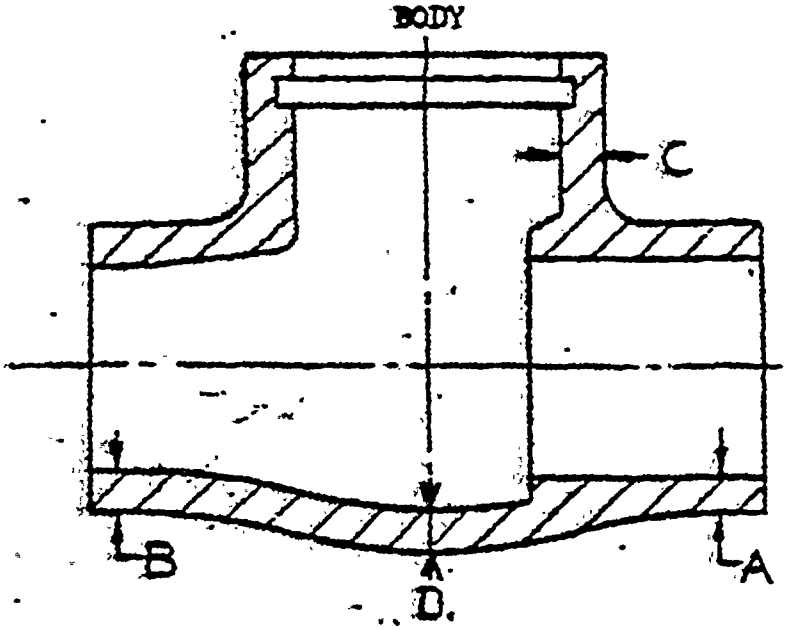
HERRON TESTING LABORATORIES, INC.

BWRPD-QC
R.E.C.
2-25-74

ATTACHMENT 2
Check Valve

S.O. 53820
Item 02

Heat No. 09164
Serial No. 02



139285

FEEDWATER.
ISOL. VALVE
BODY

	12 o'clock	3 o'clock	6 o'clock	9 o'clock
A	2.810	2.480	2.520	2.560
B	2.830	2.510	2.570	2.620
C	2.420	2.330	2.430	2.820
D.	2.600	2.440	2.650	2.450

Minimum Measurement 2.330

Remarks: FOR "C & D" DIMS 12:00 O'CLOCK IS NAME PLATE SIDE

Inspected by [illegible]
Date 12-6-75

MQCS-66-1 REV. B

M.W. Lampton Corp
Bechtel
1-15-76

TEXAS STEEL COMPANY

FORT WORTH, TEXAS

TEST REPORT

FEEDWATER ISOL. VALVE BODY

Date: March 25, 1976

Heat No.: 12055

Customer: Anchor/Darling Valve Company

Specification: ASME SA312, Grade LCB

Order No.: K518A

S.O. E-5820-3

Pattern No.	CHEMICAL ANALYSIS C	Mn	P	S	Si	Ni	Cr	Mo	Cu	V	Al	PHYSICAL ANALYSIS Tensile p.s.i.	Yield p.s.i.	Elong. in 2"
6504-1-1	.25	.78	.013	.017	.47	.06	.09	.15	.07	.005		85,500	63,500	28.0 6

24"-900# Tilt Disc Check Body Serial #5

Feedwater valve 11V1107A (body)

Heat Treatment performed per Texas Steel Company Procedure N1-TSHT (Rev. 1), Casting

Normalize - 1700 degrees F for 6 hrs. - atmospheric cooled - Chart 3204
Quench - 1650 degrees F for 6 hrs. - water cooled - Chart 3208
Temper - 1220 degrees F for 6 hrs. - atmospheric cooled - Chart 3209
PWHT - 1150 degrees F + or - 35 degrees F for 5 hrs. - atmospheric cooled - Chart 32
PWHT - 1150 degrees F + or - 35 degrees F for 4 hrs. - atmospheric cooled - Chart 32

NT performed per Texas Steel Company Procedure N1-TSNT (Rev. 0) Addendum 1.

Material marked with Pattern (6404-1-1 & 6504-1-1); Heat (12055); Serial No. (05); Specification (GHA-LCB); A/D S.O. No. (E5810-3); Description (ADV) (2-900); Gamma Ray No. (809RX); Film location markers; Heat Treatment (NQT); Magnaflux verification (MT) - Metal Stamp; Low Stress.

Charpy V-Notch Impact T

Foot/Pounds - 47, 39, 4
Temperature at +35 de
Lateral Expansion - .45
.47, .40 (44, .41 AVG)
Percent ductile Fractur
40%, 40%, 40%

This is to certify that the above is a true and correct copy of test results as evidenced by the records of the company.

We hereby certify that this material meets all requirements of the material specification and the applicable special requirements of Article NB-2000 of 1971 ASME Section III, Winter 1972 Addenda, that are required to be fulfilled by the material manufacturer.

TEXAS STEEL COMPANY

E. Kaczmarek

Authorized Signature

ATTACHMENT - 2

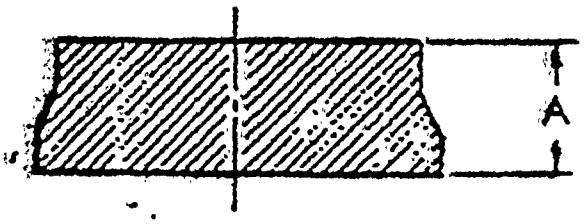
Bonnet

B.O. E5820
Item 2

Heat No. 3261094
Serial No. 3

MAY -7 '81 139285

FEEDWATER
ISOL. VALVE
BONNET



	12 o'clock	3 o'clock	6 o'clock	9 o'clock
A	4.995	4.995	4.995	4.995

Minimum Measurement 4.995

Remarks:

Inspected by 10-27-75
Date

MQC9-66-4 REV. B

W.W. Langlin
Bechtel QC
4-15-76

CANN & SAUL STEEL CO.

BROYERSFORD, PA. 19468

Report of Physical Tests and/or Chemical Compositions

FEEDWATER ISOL. VALVE BONNET (COVER)

Date 4-23-76 REVISED COPIES FOR COPIES DATED 10-30-74

Customer's Order No. X-529A S.O. #E5820-3

Cann & Saul Order No. 27717

Customer Anchor/Darling Valve Co.
701 First St.
Address Williamsport, Pa. 17701

Attention Purch. Dept.

Feedwater valve HV-4101A (bonnet)

CHEMICAL COMPOSITIONS

HEAT NO.	C	MN	P	S	SI	CR	NI	MO	CU
3261094	.28	.82	.012	.023	.25				

Lab. No.

PHYSICAL TESTS

CUT FROM	TEST NUMBER		GAUGE	YIELD PT. LBS.	YIELD PER Square In. Lbs.	BROKE AT LBS.	ULTIMATE TENSILE LBS.	ELONG - %	REDUCED AREA	Reduction %
				IS	YS .2%					
Forging	27717	1	.505	10,500	52,500	16,300	81,500	30.0	.085	57.5
"	"	2	"	10,600	53,000	16,000	80,000	30.0	.086	57.0
"	"	3	"	10,300	51,500	16,300	81,500	32.0	.071	64.5
"	"	4	"	9,600	45,000	16,300	81,500	32.0	.084	58.0

Charpy Impacts "V" Notch 0° F plus 35° F		Ft. Lbs.			Mils Lat. Exp.			Percent Shear		
	#1	39.0	49.0	38.0	43	47	41	50	60	50
→	2	44.0	42.0	38.0	45	43	44	55	50	50
	3	33.0	29.0	38.0	41	44	42	45	45	45
	4	46.0	41.0	37.0	45	41	42	50	50	50

OTHER TESTS

Sonic to C&S A388, Rev. 16 (5-8-73) :- O.K.
Mag. Part per SDL-E-5820, Para. B.2 B&PV #10 (2-25-74) :- OK
Brinell:- #1- 174/179
→ 2- 174/179
3- 174/179
4- 174/179

Customer's Specifications: ASME SA105 QT

Charpy "V" Impact 40 mils lat. exp. @ plus 35° F

BHN 187 Max.

YS .2% 36,000
TS 70,000
EL 22%
RA 30%

THE ABOVE TESTS COVER THE FOLLOWING MATERIAL:

4 - 24" C900 T.D. Bonnet Forgings per Part ~~[illegible]~~ D-7603.

Forgings serialized #1 thru 4

CANN & SAUL STEEL CO.
Inspection

W.W. Snyder
Beth Steel
4-26-76

CANN & SAUL STEEL CO.
C. Benner
Chemical Tests

ATTACHMENT 2

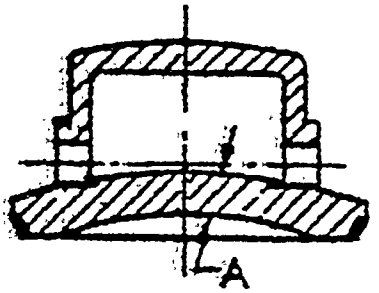
Disc

S.O. E5820

Item 2

Heat No. 5278E-2

Serial No. A880



139285

FEEDWATER
ISOL. VALVE
DISC

	12 o'clock	3 o'clock	6 o'clock	9 o'clock
A	3.005	2.990	3.010	3.000

Minimum Measurement 2.990

Remarks: 12:00 O'Clock is PATTERN NUMBER

Inspected by [illegible] St. Louis

Date 12-6-75

MQCS-66-5 REV. B

W.W. Snyder Corp.
Bechtel
1-15-76

VULCAN STEEL FOUNDRY CO.

Carbon and Alloy Steel Castings

2909 CHAPMAN STREET • OAKLAND, CALIF. 94601
PHONE (415) 261-5305

FEEDWATER
ISOL. VALVE-DISC

Feedwater valve
HV-4107A
(disc)

MATERIAL TEST REPORT

IOR VALVE CO.
7 CLAWITER RD.
YARD, CALIFORNIA 94545

DATE 4-18-75

ERIAL SPECIFICATION ASME SA-352 LCB

ASME Section III
Winter 1972 Addenda

T NUMBER 5741 E

~~DS NUMBER 518-4994-63 PATTERN NUMBER 6504-1-4 SERIAL NUMBER 2-2-4~~

ERIAL MARKED BY: Heat and Serial Numbers (Metal Stamp)

HALIZED @ 1720 °F 4 HRS 30 MIN — AQ — DATE 4-21-75 CH42175A
SS RELIEVED @ °F HRS MIN — AQ — DATE
ITION ANNEALED @ °F HRS MIN — WQ — DATE
OTHER (TEMPER) 1275 3 DATE 4-21-75 CH42175C

Chemical Properties	Mechanical Properties	
.20 Carbon	82,500 Tensile Strength, psi	
.78 Manganese	65,500 Yield Point, psi	
.36 Silicon	29.5 Elongation (%)	
.017 Phosphorus	65.4 Reduction of Area (%)	
.027 Sulfur		
Nickel		
Chromium		
Molybdenum		
Columbium		
Copper		

Charpy Impact Test
(V-Notch)
Temperature +35 °F

1
64.7 Ft Lbs
95 Shear
.060 Expansion

2
69.7 Ft Lbs
95 Shear
.064 Expansion

3
75.8 Ft Lbs
95 Shear
.068 Expansion

W.W. Snyder
Beth 4-6-76

RECEIVED
OCT 22 '75
FORMATIRA

hereby certify that this material meets all requirements of the material specification and all applicable special requirements of (Article N/A of the ASME Pump and Valve Code [Draft]) or (Article NB 2000 of the ASME Section III, Boiler and Pressure Vessel Code).

est Bars received Potential Post Weld Heat Treatment — 1150°F for 16 hours.

10-20-75
(DATE)

(QUALITY CONTROL MANAGER)

JOS. DYSON AND SONS, INC.

(CORRECTED TEST REPORT 10/8/74)

CERTIFIED TEST REPORT

P.O. B 110102-5018
S.O. N 4173
Heat # 3264794 (B-9-i)

FEEDWATER ISOL. VALVE - BOLTS

12-9-74

Chicago Bridge and Iron Co.
P.O. Box 277
Birmingham, Alabama 35202

ITEM 40 Pcs.

1-3/4" Dia. Eyebolts 2-1/32" Hole Dia. 4" Thread end 1' - 8" Long OAL Per Sketch "D"

SPECIFICATIONS: ASME SA-193 B-7 MS-850 Rev. O, QAS 333, Rev. O

MATERIAL: AISI 4145 Steel

HEAT NUMBER: 3264794 (Code B-94)

LADLE ANALYSIS: C-.45 Mn-.88 Phos-.012 Sul-.019 Sil-.31 Cr-.98 Mo-.16

CHECK ANALYSIS: C-.42 Mn-.81 Phos-.012 Sul-.018 Sil-.24 Ni-.12 Cr-.91 Mo-.16

MECHANICAL TESTS:

TENSILE	YIELD	ELONG	RED	BHN
130,000	105,000	21.0	65.4	285/302

CHARPY IMPACT TEST V NOTCH AT -30°F ASME SA-370 Para. NE-2224.3 and NE-2365 Longitudinal Type "A" 35 Ft/Lbs.

	FT/LBS	LAT. EXPANSION (IN.)	% DUCT. FRACTURE AF
	37.0	.028	55%
	41.5	.029	60%
	36.5	.025	45%
Ave.	38.5		

Meets Mechanical requirements of CB&I Spec. MS-850 Rev. O, and QAS 333, Rev. O.

HEAT TREAT DATA: Heated to 1550°F 3-1/2 Hrs. at Heat - Oil Quenched
Tempered at 1120°F 4-1/2 Hrs. at Heat - Air Cooled

Material referenced in this report has been tested in accordance with the applicable requirements of CB&I Purchase Order ASME SA-193 B-7 MS-850 Rev. O, and QAS 333, Rev. O, and meets the min. requirements.

THE ABOVE TESTS CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS LISTED
THIS CERTIFICATE NOTARIZED ONLY WHEN REQUIRED

I, Robert A. Murkey, a Notary Public do hereby certify that this affidavit was subscribed and sworn to before me by a duly authorized agent of Jos. Dyson & Sons, Inc., this 8th day of October 1974

June 8, 1977
MY COMMISSION EXPIRES

Robert A. Murkey
NOTARY PUBLIC
Lake County, Ohio

We hereby certify that the foregoing data is a true copy of the data furnished us by the producing mill or the data resulting from tests performed in the Dyson Laboratory.

JOS. DYSON & SONS, INC.

AUTHORIZED AGENT

FORM NO. 115-P REV. 2

Art Mazzarella, Q.C. Manager

...TESTING LABORATORIES, INC.
TESTING · INSPECTION · ANALYSIS
CLEVELAND, OHIO 44131

Shipper No. 00290
Your P. O. D4854
File No. H6056
17th of May 19 74

MECHANICAL TESTS
FEEDWATER SYSTEM
ISOL. VALVES — BOLTS

...of Mechanical Tests of 2" Dia. (4145) Steel Bar, Representing 1 3/4" Dia. Eye (Bolts) Per C.B.&I. Spec. MS-850 and ...333, R.O. No. N-4471 & 4473 C.B.&I.; (Heat No. 3264794) Marked: C.B.&I. P.O. No. (B110101) & (B110102)
JOSEPH DYSON & SONS, INC. Code H B-92 (-5519) (3518)
...ed to

ORIGINAL DIMENSIONS	AREA	YIELD* POUNDS	YIELD* POUNDS PER SQ. IN.	ULTIMATE STRENGTH POUNDS	ULTIMATE STRENGTH POUNDS PER SQ. IN.	ELONGATION IN 2"	ELONGATION %	REDUCED DIMENSIONS	REDUCED AREA	% REDUCTION	REMARKS
.503	.200	21000	105000	26000	130000	.42	21.0	.297	.0692	65.4	
CHARPY V-NOTCH IMPACT STRENGTH @-320°F (FT. LBS.)			LATERAL EXPANSION (IN.)			DUCTILE FRACTURE AREA (%)					
37.0			.028			55					
41.5			.029			60					
36.5			.025			45					
AVERAGE 38.5											

...S MECHANICAL REQUIREMENTS OF C.B.&I. Spec. MS-850 and QAS-333.

The above are the actual results obtained by us on the sample submitted.

Sworn and subscribed to before me this 17th day of May 1974.

Joy Marie Freda, Notary Public
My Commission Expires Feb 26, 1978

Signature
Date 12-27-74

KEE
Notary Public
I HEREBY CERTIFY THAT

*@ .2% OFFSET
...sued to

Engineer of Tests

2M.8-73